

**A Study of Mortality and Cancer Incidence in
Xstrata's Ontario Nickel Workers: History,
Results, Impact, and Recommendations**



Report by: Mr. Bradley Gottfred
Advisor: Dr. Nancy Lightfoot



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Abstract

OBJECTIVES: Xstrata is a global diversified mining group whose businesses maintain a meaningful position in seven major international commodity markets, including those of copper and nickel, with a large cohort of nickel workers employed in the Province of Ontario, Canada at Sudbury in northeastern Ontario. Operating since 1929, Sudbury operations have historically included underground, milling, and smelting related to the production of nickel, copper, cobalt and other precious metals.

The objective for this study is to: follow-up and examine cancer incidence and mortality for various diseases in this occupational cohort

METHODS: This study will describe a retrospective occupational cohort study of mortality (1964-2001) and cancer incidence (1964-2001) conducted for Xstrata Nickel's Ontario male nickel workers (n= 10,253 males). The cohort was originally assembled by researchers at McMaster University, with responsibility transferred, to the Northeastern Ontario Regional Cancer Centre of the Sudbury Regional Hospital in the late 1990s. Company nominal role and work history information were linked to provincial health data at Cancer Care Ontario. Given minimal out of province migration, using the Ontario population as a reference, standardized mortality ratios for a wide variety of diseases and standardized cancer incidence ratios were calculated overall, by start decade, by work area, by duration of employment, and by work area and duration of employment and by work area and start decade.

RESULTS: In the cohort of male workers, there were 1,984 (19.35%) deaths and 1,127 (10.99%) incident cancers. While the results reflected very few significantly high SIRs or SMRs, notable data was observed in deaths resulting from accidents, poisonings, or

violence as both workers with less than 15 years since first hire (SIR=133, 95% CI:111-158) and workers with 15 or more years since first hire (SIR=123, 95% CI:104-144) displayed significantly high results. Notable data was also seen in workers with less than 15 years since first hire, with SMRs for rail, road, or air (SMR=136, 95% CI:102-177) and possibly job-related (SMR=241, 95% CI: 159-351) significantly high.

CONCLUSIONS: There was no significant overall increase displayed for cancer incidence. Overall mortality displayed significant increases in deaths resulting from accidents, poisonings, or violence as well as deaths resulting from rail, road, or air.

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Introduction

During the late nineteenth century and into the early twentieth century large deposits of nickel were discovered in the Sudbury Basin of northeastern Ontario (1). The Sudbury Basin (Figure 1) is a 60 km by 30 km elliptical geologic structure located just north of the city of Sudbury and is generally thought to be the result of a meteorite impact that occurred 1,850 million years ago. Nickel, copper, platinum, palladium, gold and other by-product metals are yielded from the basin (1).



Fig. 1: Sudbury Basin (2)

As all the natural advantages were in place for the mining industry to excel in this region the addition of good business foresight, innovative scientific techniques, and sharp technical skills allowed the development of these deposits to be quite successful and placed Canada as one the world's leading nickel producers (5). During this time one of the major companies that emerged as a nickel producing leader in the region was

Falconbridge Nickel Mines, Limited (later Falconbridge Limited, now Xstrata Nickel) (3), the other being Inco Ltd, (now CVRD Inco).

Brief History of Xstrata Nickel at Sudbury

During the mining boom that started around 1883 in Northern Ontario, many companies were able to stake their claim (4). As time went on, new claims were made and the nickel refining process continued to evolve (4). Eventually some of the nickel that was produced found its way into military ships and demand soared during the first world war (4). However, Xstrata Nickel has a slightly more famous history due to the previous owner of its site. Nickel is required for the use of battery production and Thomas Edison acquired the mining rights in Falconbridge, Ontario (4). Using a magnetic dip needle survey he detected the main ore body at Falconbridge but failed in his attempts to prove the source of the anomaly by digging a shaft and as a result he let his claims lapse (4). By 1911, the former Edison claim had reverted back to Crown Land and RM Bennett and EJ Longyear took up the ground and used diamond drilling to intersect the main Falconbridge ore body in 1916 but no buyer could be found for the deposit and the claims remained idle after 1918 (4). In 1928, Falconbridge Nickel Mines was incorporated by Thayer Lindsley and he began to build the company into one of the most successful nickel mining companies in history (3). Over the next century Falconbridge grew tremendously. By 1930, ore from an underground mine was being extracted at 250 tonnes per day, and a nearby smelter was in operation to process the material (3). By 1932, a mill and sintering facility began operation (3). As the decades passed over a dozen mines went into production in the Sudbury area, advances in the refining and leaching processes were accomplished, and key mergers and acquisitions were carried

out. In 1962, Falconbridge acquired Ventures Limited, which allowed for further expansion and growth outside of Canada (3). By 1984, the commercial reserves at the original Falconbridge Mine had been exhausted; however, production continued at several other sites in the Sudbury area and the company expanded within northern Ontario by acquiring the Kidd Creek mine in Timmins, Ontario (3). Expansion continued in the 1990s, with a new mine (Kidd Creek) in Sudbury, and one at Raglan in northern Quebec (3). In June 2005, Falconbridge Limited merged with Noranda Inc., previously the 58.9% owner (3), continuing under the name Falconbridge Limited (3). Most recently Falconbridge Limited was acquired and absorbed by Xstrata (3) in late August 2006 and now operates as part of Xstrata Nickel (3). Over the years Falconbridge has also made a name for itself in other ways. In 1977, Falconbridge patented its own revolutionary chlorine leach process to refine nickel matte (3) and in 1999 Falcondo, located in Bona0, Dominican Republic, received ISO 14001 environmental certification, making it the first nickel production facility in the world to achieve this status (3). For a company to receive an ISO 14001 environmental certification is a very important achievement since it requires an environmental policy to be in existence within the organization, fully supported by senior management, and outlining the policies of the company, not only to the staff but to the public. The policy needs to clarify compliance with environmental legislation that may effect the organization and stress a commitment to continuous improvement (6).

Although many mines have closed over the years leaving no operating mines in the town of Falconbridge, the company still continues to thrive in the Sudbury basin. Today, the

Falconbridge operations employ over 14,000 people in 18 countries and is the fourth largest copper, fourth largest nickel, and fifth largest zinc producer in the world (5).

Nickel

Nickel (*Symbol* Ni) was discovered in Sweden in the year 1751 by Axel Cronstedt. It was discovered while searching for the mineral kupfernickel (“false copper”), hence its name (7). From a qualitative point of view, it is/has: hard, malleable, ductile, lustrous, a silver-white metal, and a face-centered cubic crystalline structure (8).

Today nickel is the fifth most common element in the earth (9). How the earth came to have this abundance of nickel has been attributed to meteorites. *“Billions of years ago, nickel was created in supernova explosions. This is the only place in nature where the temperature and pressure conditions were sufficient for the nickel atom to form (9)”*. The results of meteorite hits caused geological structures such as the Sudbury Basin to form (9). Although meteor impact sites are rich with nickel, the element can be found throughout the world (9). The average worldwide concentration in soil is eight parts per million (ppm) (10). In Ontario, the background concentration of nickel can be as high as 43 ppm, with the occasional area that naturally contains higher concentrations (10).

The major use of nickel is in the preparation of alloy because it provides strength, ductility, and resistance to corrosion and heat (9). How it is used can be seen on the following graph.

Nickel First Use

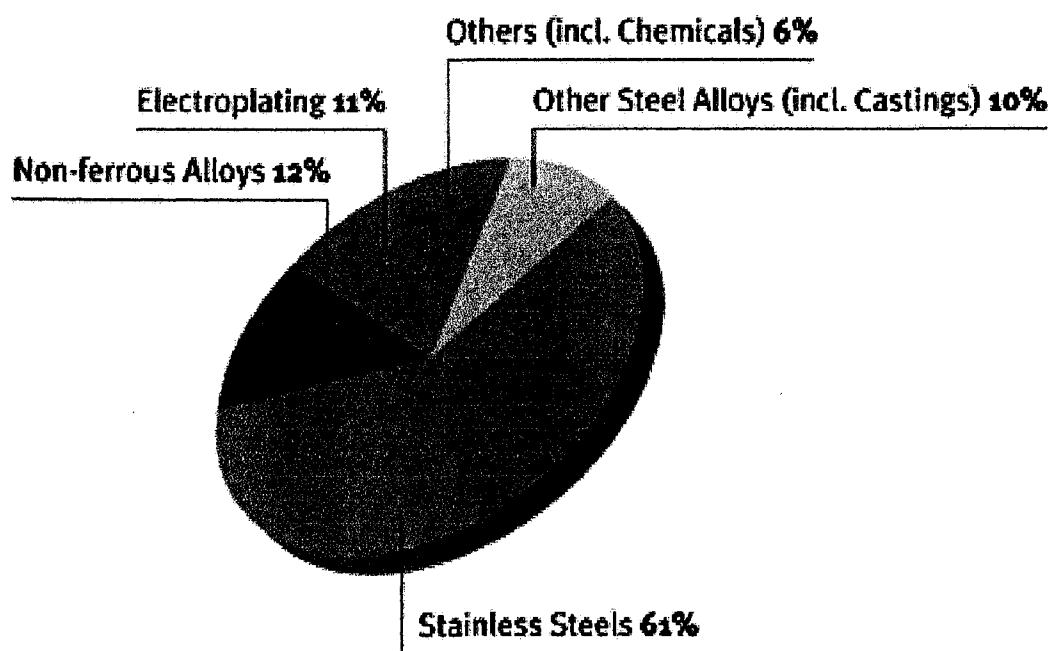


Fig. 2: Nickel First Use (9) (incl. = including)

Some health risks have been associated with nickel exposure. On a superficial level there is the possibility of skin allergies (11). This sensitivity to nickel occurs in roughly 1-2% of men and 10-20% of women and is generally the result of direct and/or prolonged skin contact (e.g. from exposure to low quality jewelry) (11). This sensitivity occurs when nickel dissolves in sweat and penetrates the skin, which is why only nickel metal, and not nickel alloys, can be problematic (11).

The more serious problem associated with nickel can be found in industrial settings, specifically with nickel mining. Due to the increased exposure to nickel through inhalation or ingestion, there have been many studies conducted and although more

studies need to be undertaken, there is some evidence to suggest associations between nickel exposure and lung/nasal cancer. Chovil et al. (1981) conducted a cohort study of 495 sinter plant workers that were examined from 1948 to 1962. The results showed that the risk of developing respiratory cancer doubled at levels of exposure of 12 months (12). Menvielle et al (2003) observed several associations between occupational exposures and lung cancer in New Caledonia (13). The case-control study included 228 workers that had developed lung cancer (diagnosed between 1993 and 1995) and 305 population-based controls. While no significant association was found between lung cancer and nickel mining and refining, increased risks of lung cancer were present in bus and truck drivers (OR 2.7, 95% CI: 1.1-7.3) and significant odds ratios were observed for exposure at the highest level of cumulative exposure to inorganic fertilizer (OR 9.3, 95% CI: 1.5-55.6), field dust (OR 2.6, 95% CI: 1.0-7.3), and household cleaning products (OR 15.1, 95% CI: 1.3-170) (13).

The International Agency for Research on Cancer have classified: “Nickel compounds as carcinogenic to humans (Group 1)” and “Metallic nickel is possibly carcinogenic to humans (Group 2B) (14).” However, it is important to consider level, frequency, and duration of exposure when assessing risk.

Nickel Mining

For a successful nickel mining operation to take place there are many steps involved, the first of which is exploration. In the early days of mining a lot more luck seemed to be involved in the process, whereas today satellite imagery, computers, and drilling

programs are used to best determine the sites with the most potential (15). Once a site has been chosen as a potential mining site the office work must then commence (15). Such activities as consultation, environmental assessments, and financial feasibility studies must all be carried out to make sure that not only will the mining operation be profitable, but that it will be done in a safe and responsible manner (15).

Once mining commences, there are various methods used depending on the geological makeup of the site (15). In many cases an open pit dig or surface mining is used, while at the Sudbury Falconbridge mines the operation takes place underground so drilling and blasting are the main methods used (15). The ore extracted from the mines is then processed at the mill (15). To separate the desired minerals, the ore is crushed into a fine powder and then processed through an industrial-style "bubble bath" known as flotation (15). As the minerals repel water, they will stick to the air bubbles and float to the surface where they are removed, dewatered, and the resulting concentrate is sent off to a

smelter (15).

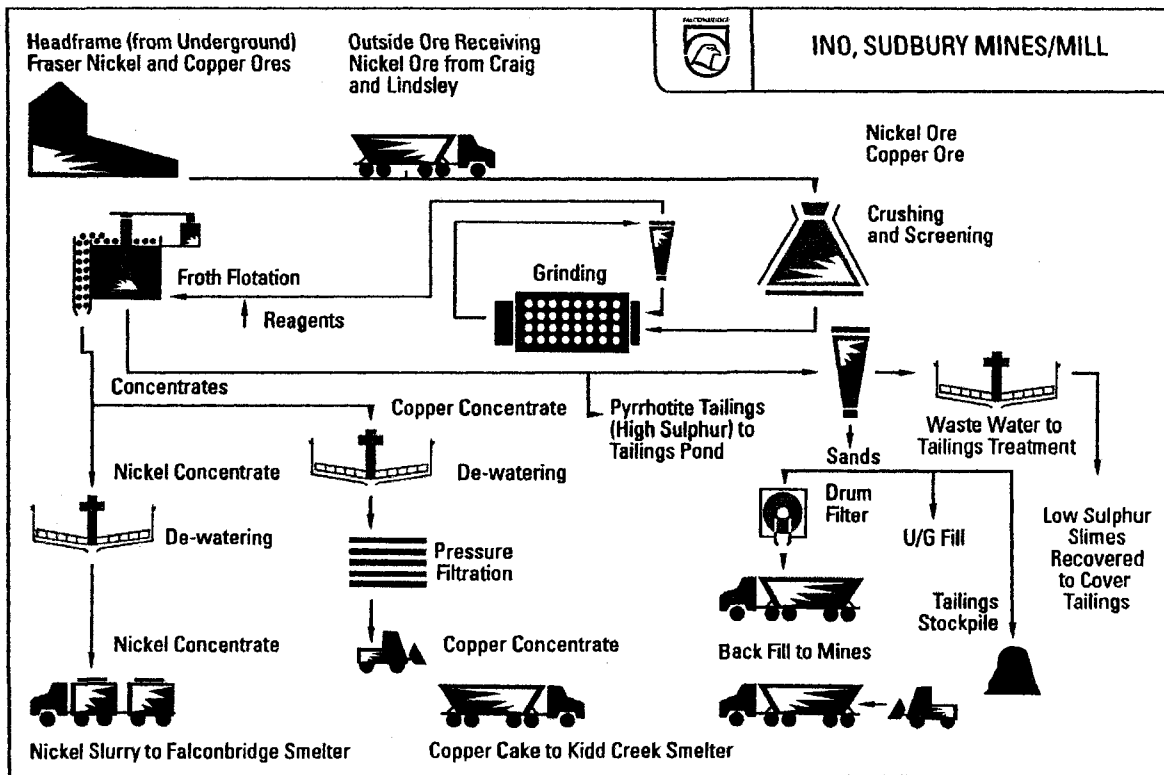


Fig. 3: Mining Lifecycle (16)

The process of smelting simply consists of feeding the concentrate through high temperature furnaces to remove any impurities (15). Any impurities that may remain are removed with a final refining stage, which also separates metals from one another (15).

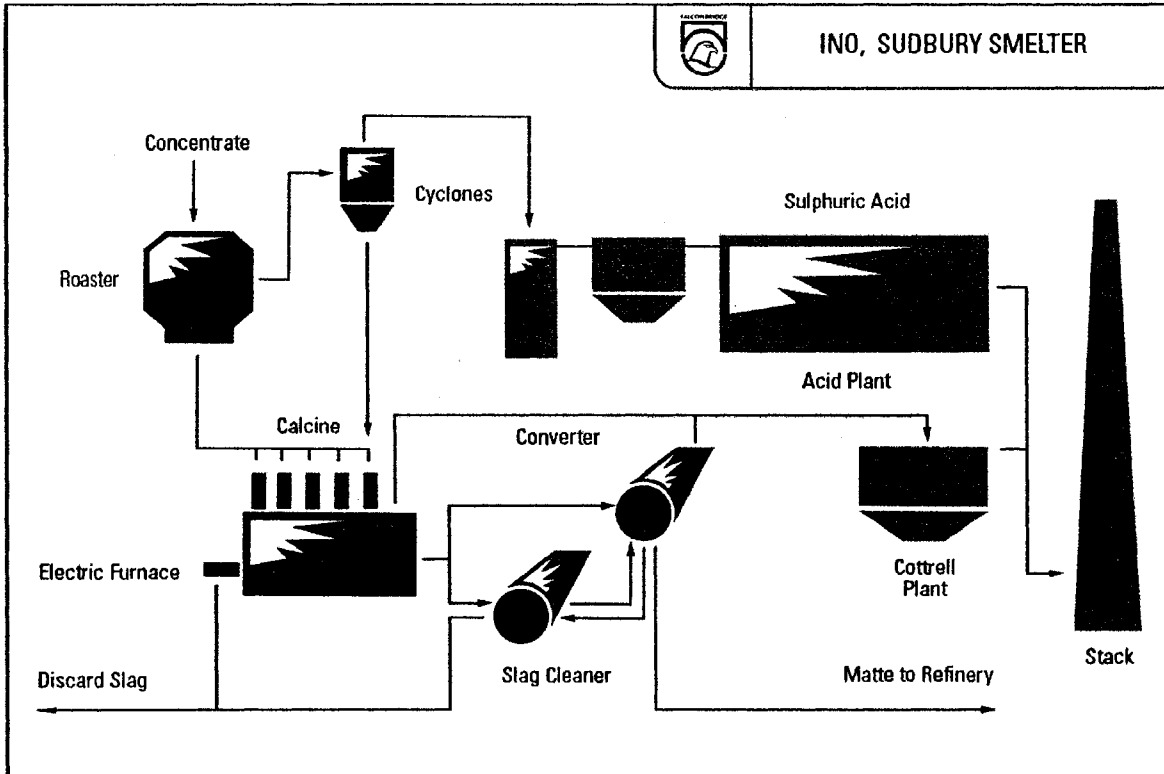


Fig. 4: Smelting Lifecycle (16)

Over the last 80 years there have been many mines in operation for Falconbridge, with the peak decades occurring between the 1960s and 1970s (Figure 5).

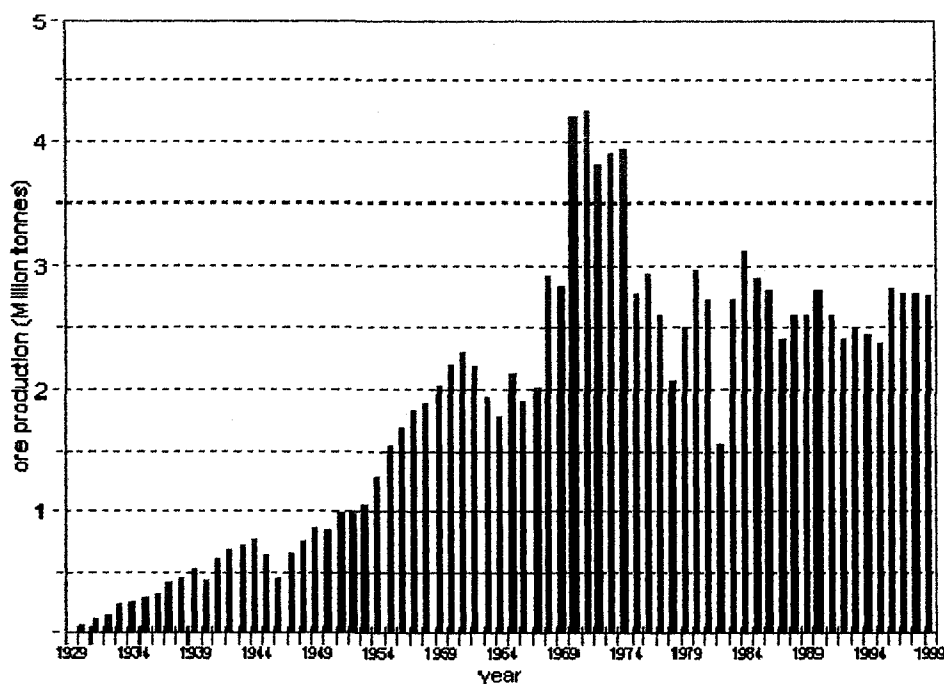


Fig. 5: Falconbridge Ore Production Over the Years (17)

This growth was made possible by the importance that Thayer Lindsley placed on continued exploration for new mines (17). Using a program of systematic mapping that measured anywhere from 1 inch to 400 feet deep, accompanied by Hotchkiss superdip magnetic surveys, many new finds were acquired (17). One of the first new sites developed in 1935 was the Hardy property (Hardy mine) (17). By 1942, electromagnetic surveying became an additional tool to discriminate the source of magnetic anomalies detected by exploration (17) and helped lead to the acquisitions of the Mount Nickel property, the Strathcona property (Longvack mine) and later the McKim Mine (1947) (17). The 1950s and 1960s brought even more expansion and land acquisition resulting in the development of the Boundary, Fecunis Lake, Onaping, Strathcona North, and Longvack South mines (17). Once expansion had peaked, Falconbridge's Sudbury

production had an all-time high in 1971 with 4.2 million tonnes of ore treated in company plants (17).

Today, Xstrata Nickel's Sudbury operation has three nickel and copper mines operating in the Sudbury area, that is, the Craig (largest mine in Sudbury), Fraser, and Lindsley mines (16). The 3 million tonnes a year of ore these mines produce are sent to the Strathcona mill that produces both a nickel-copper concentrate and a copper concentrate (16). The nickel-copper concentrate is then sent to the Sudbury smelter and produces 130,000 annual tonnes of nickel-copper matte (16).

The Relationship Between Nickel and Cancer

Many studies have been carried out to examine the health effects that nickel has on the human body and what the exact mechanism is that could cause the onset of certain types of malignancies, often in the respiratory tract. A major deficiency of several studies is the absence of consideration of exposure assessment and nickel species.

There are three main modes of entry into the body for nickel: inhalation, ingestion, and dermal absorption (the latter being very insignificant) (18). Of the three modes of entry, inhalation appears to be of the greatest concern since previous studies have shown that when nickel enters the body through this route the lung, heart, diaphragm, brain, and spinal cord tissues may selectively concentrate the nickel, in that order, in terms of amount accumulated (18). Carcinogenesis is a very complex process and tumour development involves an initiation, promotion, and progression stage (18).

Unfortunately, it is not known exactly how nickel contributes to carcinogenesis, but there have been a few proposed mechanisms (18). According to Haitain et al. (2005), the carcinogenic actions of nickel compounds are thought to involve oxidative stress, genomic deoxyribonucleic acid (DNA) damage, epigenetic effects, and the regulation of gene expression by activation of certain transcription factors related to corresponding signal transduction pathways (18).

Previous Studies

Much attention has been paid to cancer in nickel workers since an early increased risk of nasal and sinus cancer was observed in Britain in 1932 by the Chief Inspector of Factories (12). At The Mond Nickel Company (1929-1938), an abnormal incidence of lung and nasal cancers was observed in both nickel refining workers and nickel and copper salt preparation workers (12). Specifically, the cohort study showed that deaths from lung cancer (SMR=869, O=37, E=4.26) occurred most often among workers employed as calciner furnace operators because they were exposed to dusts emitted during high temperature oxidation of nickel-copper sulfide (12). To date 85 nasal cancer and 280 lung cancer cases have been associated with working at the Clydach Refinery (19).

One of the simplest studies in this area, performed in 1988, took lung tissue samples from 45 individuals to examine nickel and chromium content (20). In order to establish normal values, the first 30 pulmonary tissue samples were obtained from normal individuals that died from traffic accidents, intoxication, or suicide. The final 15 samples

were obtained from people known to have been exposed to the metals (11 nickel refinery workers, of whom 10 had died of lung cancer, 2 stainless steel welders, 1 foundry worker, and 1 electrical technician). Of the 495 tissue samples from the normal group, median nickel concentrations of 20-40 ng/g (wet weight) were observed. In contrast, the nickel concentrations measured in the 11 refinery workers were found to be 112-5,860 times higher (20). As a result, the authors stated that “the very high nickel concentrations found in the samples of lung tissue from former nickel refinery workers should be regarded as a guideline with regard to the appraisal of the causal relationship between lung cancer and occupational exposure to relatively insoluble nickel compounds.”(20) One of the major issues with this study was how to accurately collect lung tissue samples. This study used a new approach that used both lungs of every individual and then separated them into a segmental pattern. Another problem that arose with the study was the presentation of distinct interindividual concentration differences in the 30 “normal” individuals.

It was not possible to establish occupational exposure to chromium and nickel, and it was also not possible to establish possible exposure in the private sector. In addition, environmental factors and various other factors such as age, smoking, family history of lung cancer, pulmonary diseases, may have played a role (49).

A small case-control study was conducted in Taiwan in 2006 (21). This study involved 102 subjects (60 patients with lung cancer and 42 control patients) that provided lung tissue samples. Nickel contents in lung tumors of lung cancer patients were significantly higher than those in normal lung tissue of non-cancer controls patients (21).

Norway

An occupational cohort study that included exposure assessment was undertaken in the Xstrata Norwegian nickel refinery workers (22). Personal exposure measurements between 1973 and 1994 were taken (1972 to 1910 was estimated, taking into account changes in the metallurgical process and work environment; whether a hygienist was involved with the sampling was not specified) and used to develop a department-time-exposure matrix (e.g. water soluble, limited solubility particulates, and metallic nickel distributions were derived from speciation analyses) (22). The results revealed that for all workers, after 1978, the average concentration of nickel in the breathing zone was $0.7\text{mg}/\text{m}^3$ or under. The highest concentrations ($2\text{-}6\text{mg}/\text{m}^3$) were exposed to roaster and smelter workers before 1970, while the lowest concentrations ($0.15\text{-}1.2\text{mg}/\text{m}^3$) were exposed to nickel electrolysis and electrolyte purification workers (water-soluble nickel exposure was equivalent throughout the workers) (22).

Within this cohort, a nested case-control study that followed Norwegian nickel-refinery workers employed for more than 12 months between 1910 and 1989 and who were still alive and residing in Norway after January 1st, 1953 demonstrated an elevated risk of lung cancer was demonstrated (23). During the period from 1953 to 2000 an overall standardized lung cancer incidence ratio was 260 (95% CI: 230-290, O=267, E=104) was observed (23). While the risk was highest among workers employed during the 1910 to 1929 period (SIR=480, 95% CI: 280-760), workers from subsequent decades still displayed high SIRs of: 270, 220, and 370, from the periods of 1930 to 1955, 1956 to

1978, and 1979 to 1989, respectively (23). When considered by department a three-fold risk for lung cancer was observed among employees who had worked in the roasting and smelting departments, while a three and a half to four-fold risk was observed among those who had worked in the electrolysis department (23). A two-fold increased risk was observed for those workers employed in the maintenance department (23). Also, out of the 256 men who had been working for 15 or more years in the electrolysis department, 36 (14%) developed lung cancer, resulting in an SIR of 600 (95% CI: 420-830) (23). For those workers with 15 or more years employed in the smelter or roasting departments, an SIR of 330 (95% CI: 180-560) was observed (23). The estimates of different forms of nickel in the air were based on 5,900 personal measurements of total nickel taken regularly between 1973 and 1994, and on identification of water-soluble, sulfidic, oxidic, and metallic nickel in the refinery dusts and aerosols during the 1990s (23). Time and department specific concentration estimations were then made for the whole production period from 1910 to 1994. For exposures previous to 1973 a backwards calculation was employed (using various multiplication factors based on technology and chemistry modifications and environmental changes), and exposures after 1994 were considered to be the same levels as the early 1990s (23). Therefore, these personal measurements of nickel in the air from 1973 to 1994 could contain inaccuracies and misclassifications and may also not reflect important changes that occurred during the years that the personal measurements were not taken.

In another study, 1916 Norwegian nickel refinery workers who commenced work prior to mid-1971 were followed from 1953-1971 and the following observed to expected ratios

were found for all roasting, smelting, and electrolysis workers together: lung cancer 6:1; nasal cancer 37:1; laryngeal cancer 4:1 (men who commenced work prior to 1940 were at the highest risk) (24). Follow-up studies through 1979 for workers that started prior to 1966, found an observed to expected ratio of 26.3:1 for nose and nasal cavity cancers, and 3.7:1 for lung cancer (25). An increased risk was observed for employees of processing departments versus no-processing departments (when categorized by area of longest work) (25). When observed over different years, it was found that there was an excess risk of lung cancer for workers first employed as late as 1959; also, nasal cavity cancer risk greatly declined for those first employed near 1960 versus 1930 (25). During the follow-up periods of 15 to 24, 25 to 34, and 35 or more years it was evident that risk for both lung and nasal cancers consistently decreased (with peak risk observed during the 25 to 34 year period) (25).

Grimsrud et al. (2005) examined time- and department-specific exposure and estimates were developed for arsenic, sulfuric acid mists, and cobalt in air on the basis of personal measurements and chemical data on raw materials and process intermediates. A case-control study nested in a cohort of refinery workers that involved 213 cases (diagnosed 1952-1995) and 525 age-matched controls was performed and the following table (Figure 6) of results was produced (26). Whether a hygienist was involved with exposure assessments was not clear. Grimsrud et al. also stated that "Occupational exposures other than nickel posed no threat to the validity of the risk estimates according to nickel exposure and smoking (26)."

TABLE 2. Smoking-Adjusted* Odds Ratios for Lung Cancer Estimated by Multivariable Conditional Regression

Type of Exposure	Category	Limits	Mean \pm SD [†]	Cases No.	Controls No.	Crude	Adjusted	Linear Trend
						OR [‡] (95% CI)	OR [§] (95% CI)	OR [¶] (95% CI)
Nickel								
Water-soluble nickel						1.7 (1.3–2.2)	2.1 (1.3–3.2)	
Any form of nickel (ever exposed vs. never exposed)	Unexposed**			9	53	1.0	1.0	
	Exposed			204	472	1.5 (0.6–3.5)	1.4 (0.6–3.4)	
Arsenic [(mg/m ³) \times years]	Unexposed**			112	351	1.0	1.0	0.9 (per unit) (0.6–1.4)
	Low	0.000–0.009	0.003 \pm 0.003	37	58	1.8 (1.1–3.1)	1.3 (0.7–2.3)	
	Medium	0.01–0.17	0.06 \pm 0.05	33	58	1.7 (1.0–3.0)	1.2 (0.7–2.3)	
	High	0.18–5.9	1.0 \pm 1.3	31	58	1.8 (1.0–3.3)	1.2 (0.6–2.4)	
Asbestos (years)	Unexposed**			130	314	1.0	1.0	1.0 (per 10 years) (0.6–1.4)
	Low	0.04–2.1	1.0 \pm 0.58	31	71	0.9 (0.5–1.5)	1.0 (0.6–1.7)	
	Medium	2.2–9.0	4.6 \pm 1.9	27	70	0.9 (0.5–1.5)	0.9 (0.5–1.6)	
	High	9.1–47	20 \pm 7.6	25	70	0.8 (0.5–1.4)	0.8 (0.3–1.7)	
Sulfuric acid mist [(mg/m ³) \times years]	Unexposed**			179	451	1.0	1.0	1.0 (per unit) (0.9–1.1)
	Low	0.02–0.70	0.31 \pm 0.19	9	25	1.1 (0.4–2.5)	1.0 (0.4–2.3)	
	Medium	0.71–4.0	2.3 \pm 1.0	11	25	1.3 (0.6–2.9)	1.0 (0.4–2.4)	
	High	4.1–37	9.1 \pm 7.0	14	24	1.8 (0.8–3.9)	0.8 (0.3–2.0)	
Cobalt; rise in OR per [(mg/m ³) \times years]						1.3 (0.9–1.8)	0.7 (0.3–1.4)	
Cobalt [(μ g/m ³) \times years]	Unexposed**			9	53	1.0		
	Low	0.31–29.5	10 \pm 8.2	49	158	1.5 (0.6–3.8)		
	Medium	29.7–142	75 \pm 32	73	157	2.4 (1.0–5.6)		
	High	144–3,100	630 \pm 635	82	157	2.9 (1.2–6.8)		
Carcinogenic exposure in work outside the refinery** (years)	Unexposed**			131	343	1.0	1.0	1.2 (per 10 years) (0.9–1.5)
	Low	0.03–3.9	2.1 \pm 1.1	27	61	1.0 (0.6–1.8)	1.0 (0.5–1.7)	
	Medium	4.0–14.4	8.4 \pm 2.9	29	61	1.0 (0.6–1.7)	1.1 (0.6–2.0)	
	High	14.5–49	25 \pm 8.7	26	60	1.2 (0.7–2.0)	1.5 (0.8–2.8)	

*Smoking habits in 5 categories (never smoker; former smoker; or current smoker of 1–10, 11–20, or >20 g/day).⁸

[†]Mean \pm SD, arithmetic mean with standard deviation.

[‡]Crude OR, odds ratio adjusted for smoking but unadjusted for other occupational exposures listed in the table.

[§]Adjusted OR, odds ratio adjusted for smoking and for occupational exposures with estimates specified in the column.

[¶]Adjusted OR, each categorical variable replaced with the corresponding continuous variable, one at the time.

^{||}Increase in OR per unit of $\ln(CE_{w-s, Ni} + 1)$, the natural logarithm of the expression $(CE_{w-s, Ni} + 1)$ where $CE_{w-s, Ni}$ is the cumulative exposure to water-soluble nickel [(mg/m³) \times years].

**Reference category.

^{††}Identification of occupations based on evaluations by IARC.²³

Fig. 6 Smoking-Adjusted Odds Ratios for Lung Cancer (26)

Finland

A study at a copper/nickel smelter and nickel refinery in Harjavalta, Finland examined cancer incidence rates among 1,388 workers employed for at least three months. During the period from 1960 to 1985, 1,155 of the workers were exposed to nickel in various areas (27). The results indicated that the overall cancer incidence among both nickel exposed and unexposed workers were at expected levels (27). There were two significant findings though, the first of which observed an increase in lung cancer amongst smelter

workers that had both a latency exceeding 20 years and were exposed to insoluble nickel compounds (SIR=159, 95% CI: 192-573, O=2, E=0.1) (27). Also, refinery workers exposed to nickel sulfate (0.5 mg/m^3) and other low (undefined) concentrations of nickel compounds had an increased risk for nasal cancer (SIR = 411, 95% CI: 497-148), stomach cancer (SIR 498, 95% CI: 162-116), and lung cancer (SIR = 261, 95% CI: 96-567) (27). These were also all positively associated with latency and duration of employment.

New Caledonia

Nickel has been mined at New Caledonia since 1866 and smelted there since 1885, with the ore coming from open pit mines scattered around the island (28). In one small case-control study using cases from 1970-74 (68 lung cancer cases and 109 cancer-free controls from the hospital; age, nickel occupation, and smoking were considered) in a nickel smelting area, working in the nickel industry was shown to be significantly associated with lung cancer development (RR = 3.0, $p < 0.05$). The same was true for smoking (RR = 22, $p < 0.05$) (28). Unfortunately specific exposure levels were not indicated.

Another small case-control study examined lung cancer cases diagnosed between January 1993 and December 1995 (228 lung cancers, 305 population controls) (13). Although there were some findings that suggested an association between lung cancer and factors such as exposure to field dust (tremolite fibers), overall there was no significant association found with exposures related to nickel mining and refining (13). However,

both this study and the former study were quite small in scale, so a much larger study was warranted.

A larger 10-year case-control study (1978-1987) used a cohort of nickel industry workers comprised of 80 lung cancer, 12 larynx cancer, 20 pharynx cancer cases, and 298 controls, and took account of 18 substances to which workers were exposed, five of them nickel compounds. The study examined the incidence of respiratory cancer (lung, pleural, nasal, larynx, and pharynx) within a cohort of male nickel mining and for refining workers there was no increased risk detected in nickel workers as compared to the general male population (29). A further case-control study within the cohort was undertaken and included nickel industry workers comprised of 80 lung, 12 larynx, and 20 pharynx cancer cases (with 298 controls) (29). Eighteen substances to which the workers were exposed were considered, five of which were nickel compounds. Once again there was no evidence indicating an increase in respiratory cancers (apart from laryngeal cancer in relation to level and duration of exposure to dust and engine exhaust fumes on mining sites) (29). Although this study was much larger than the two previously mentioned New Caledonian studies, it was still considered to be deficient in study power. As all three of the studies do not support increased risk of respiratory cancers in New Caledonian nickel workers, it has been suggested that an associated risk with mineral fibers in the geologic strata, tobacco, and alcohol consumption may account for the results (29).

Alberta

A retrospective cohort study was carried out in Fort Saskatchewan, Alberta that examined the mortality rate among employees at a hydrometallurgical nickel refinery and fertilizer complex from 1954 to 1995 (30). The study included 1,649 men that had worked for at least 12 continuous months between 1954 and 1978. As with the studies in New Caledonia, there was no association found between respiratory cancers and nickel or nickel compound exposure (718 men were exposed) (30).

Ontario, Canada

In contrast to many of the larger studies that will be detailed, there was an earlier retrospective study undertaken that focused on respiratory cancers in a cohort of nickel sinter plant workers at the Copper Cliff operation from 1948 to 1962 (12). Follow-up of these 495 workers to the end of 1978 (workers must have had five or more years total service) yielded 54 cases of lung cancer and 8 cases of sinus cancer (12). Of the 54 cases of lung cancer an SMR of 869 (95% CI, O=37, E=4.26) (12) was observed. It was found that the risk of both lung and sinus cancers were much higher during earlier years of employment, specifically a 40% incidence for those employed during the first year of operation (12). Twelve months of exposure (six months in the earlier years) resulted in an approximate doubling of risk of developing lung or sinus cancer (12).

One of the first retrospective cohort studies on overall mortality from the Falconbridge cohort examined male workers (11,594) with at least six months of employment between 1950 and 1976 (31). While accidental and violent deaths were significantly high (SMR = 161, 95% CI:142-182, O=242, E=150.5) the data also suggested that miners had an

increased risk of lung cancer mortality (SMR = 123, 95% CI:90-163 O=46, E=37.5), as well as laryngeal and prostate cancer (31). Unfortunately the observed numbers were small and the results were not statistically significant. As the study continued, the SMR for accidental and violent deaths was 161 (95% confidence limits of 142-181; O=242, E=150.5; $p < 0.001$) and for all causes was 108 ($p < 0.05$) (31). Given that the results suggested that more detail was needed for laryngeal (SMR = 261, 95% CI:84-608, O=5, E=1.9) (32) and lung cancers in mines, mills, and miners, an additional study was undertaken (32). The results indicated a higher SMR in men with shorter versus longer exposures (variable exposures but must have had at least 5 years exposure and 20 years latency) in cases of laryngeal cancer, while mortalities from all cancers for sinter plant workers were significantly higher with an SMR for lung cancer of 214 (95% CI) (32). Other cancers were either not present or not statistically significant (32). Dust levels were also measured using konimeter samples. The early 1960s mine samples indicated that levels remained constant (downward trend) and around 250 particles per cm^3 , while the smelter dust samples also showed a steady decline in levels since the 1960s (with a slight increase in the 1970s due to temporary modifications), dropping from 400-500 to 150-200 particles per cm^3 (32).

As the study was continued on the Falconbridge cohort from 1950 to 1984 ($n = 11,567$), the SMR for lung cancer beyond 15 years from first hire was significantly elevated overall (at the 5% level or better) and in miners, being 128 and 153, respectively (33). As more potential causes of death were considered, it was found that both total causes and accidental and violent deaths were significantly increased (SMR = 108, 95% CI: 103-114, O = 1398, E = 1289.3; and SMR = 160, 95% CI: 143-177, O = 345, E = 216.2,

respectively), while nervous system disorders were significantly decreased (SMR = 49, 95% CI: 21-97, O = 8, E = 16.2) (33). However, only accidental and violent deaths were significantly elevated when this was repeated for mortality 15 or more years since first hire (SMR = 137, 95% CI: 113-164, O=116, E=84.9) (33). For specific cancers for total mortality, respiratory system cancer deaths were significantly increased (SMR = 128, 95% CI: 105-155, O = 104, E = 81.3) along with trachea, bronchus, and lung cancer (SMR = 129, 95% CI: 104-156, O = 98, E = 76.6). Aside from cancers, there was also a significant increase in deaths resulting from pneumoconiosis (SMR = 877, 95% CI: 269-1945, O = 5, E = 0.6) (33). By department, underground workers almost always displayed significantly higher mortality rates, while those workers in administrative positions almost always displayed significantly lower in mortality rates. Mortality rates were also considered by time periods (based on start dates, duration of exposure, etc). The longer a worker was exposed, the higher the increase in mortality. The year a worker started work did not appear to have any evidence of higher or lower mortality rates (those starting after 1960 had the highest SMR, but the difference was small). In other areas, mortality for sinter plant workers displayed only significant increases in SMR for accidental, violence, and poisoning deaths after first hire (SMR = 136, 95% CI: 105-174), while decreases were found in all other causes of death from first hire (SMR = 71, 95% CI: 55-89, O = 68, E = 96.3) (33).

One of the largest retrospective cohort studies ever carried out on nickel workers was the result of a 1975 collective bargaining agreement between Inco (now CVRD Inco) and the United Steelworkers of America (34). The initial study involved investigating mortality

for all male hourly workers who worked in Inco's Ontario Division for six months or more and where known to be alive on or after January 1st, 1950 (except sinter plant workers for whom any length of time was considered acceptable) (34). The study yielded 54,724 eligible subjects, 50,436 of which had worked in the Sudbury area and 4,288 in the Port Colborne Nickel Refinery (PCNR) (34). Mortality was examined from 1950 to 1976. The only significant overall results for Sudbury workers were for accidental and violent deaths (SMR = 137, $p < 0.001$, O=1,077, E=785.48) and neoplasms (sinter plant workers) (SMR = 177, $p < 0.001$, O=74, E=41.78). When SMRs were examined for workers with 15 or more years since first hire (to account for latency in cancer) there were no statistically significant results for nasal, laryngeal, lung, and kidney cancer for Sudbury workers and for underground miners (excluding sinter plant workers) (34). However, there were statistically significant results observed for underground workers with 15 or more years since first hire. SMRs of 167 ($p=0.003$) and 142 ($p=0.03$) were observed for prostate and pancreatic cancer, respectively (34). Only miners with five or more years experience had significantly increased SMRs for pancreatic (SMR = 161, $p=0.009$) and prostate (SMR = 192, $p=0.0004$) cancer (34). For the Sudbury sinter plant workers there were statistically significant SMRs observed for lung cancer (SMR = 463, 95% CI: 334-626; O = 42, E = 9.08), nose, nasal, and associated cancers (SMR = 2,174, 95% CI: 222-8,000; O = 2, E = 0.09), and overall cancers (SMR = 219, 95% CI: 173-281; O = 65, E = 29.67) (35). Port Colborne workers in the leaching, calcining and sintering areas had statistically significant SMRs for lung cancer (SMR = 298, 95% CI: 220-394; O = 49, E = 16.44), nose, nasal, and associated cancers (SMR = 9,412, 95% CI: 5,529-

15,294; O = 16, E = 0.17), and overall cancers (SMR = 193, 95% CI: 161- 33; O = 112, E = 58.14) (35).

In a follow-up study (which used the same eligibility criteria previously mentioned) that followed 54,509 men from 1950 to 1984 employed by Inco's Ontario Division, of the 54,509 men included, 50,222 worked in the Sudbury area and 4,287 in Port Colborne (36). Overall the mortality follow-up showed that 8,387 men out of the 54,509 had died during the 35 year period, with overall all-causes SMRs of 103 (95% CI, O = 7,382, E = 7,138.3) and 96 (95% CI, O = 1,005, E = 1,044.7) for the Sudbury area workers and the PCNR workers, respectively (36).

Other Studies

A retrospective cohort study carried out at the University of Pittsburgh described the cause-specific mortality patterns of 28,261 workers employed at 12 different plants involved with the production of high nickel alloys from 1956-1960 (administrative/office staff excluded), followed up until the end of 1977 (37). Each worker was also required to have worked for at least one year to be considered eligible for the study. This study found almost no statistically significant increases in the risk of lung, nasal sinuses, larynx, or kidney cancers (37). The only significant findings indicated that males employed in the maintenance categories had an excess risk of dying of lung cancer (e.g. a 25-50% increase) (37). More specifically, for workers in allocated services, SMRs were significantly increased for lung cancer in men (SMR = 117, $p < 0.05$). For those workers with less than 15 years since first hire and five or more years cumulative exposure the

SMR for lung cancer was 142.8 (95% CI. O = 36, E = 25.21). The lung cancer SMR was even higher (172, 95% CI, O = 20, E = 11.63) for workers with more than 15 years since first hire and less than five cumulative years exposure (37). Those workers with 15 or more years since first hire and five cumulative years exposure had a lung cancer SMR of 124.3 ($p < 0.05$, O = 161, E = 129.57). Liver and large intestine cancers both displayed significantly high SMRs of 182 and 233 respectively (37).

In a retrospective cohort study, cancer incidence and mortality was examined in a group of Swedish battery workers exposed to nickel hydroxide and cadmium oxide (38). The cohort study included 869 workers, employed at least one year between 1940 and 1980 and results were observed up to December 31st, 1992. In the entire cohort, a total of 315 deaths (292 men, 23 women) occurred. For men, the overall SMR was 106 (95% CI: 937-1180) and for women was 83.8 (95% CI: 531-1,260) (38). The SMRs for total cancer mortality were 125 (95% CI: 982-1,570) for men and 69.5 (95% CI: 255-1,510) for women. Lung cancer displayed an SMR of 176 (95% CI: 101-287) in males, while no lung cancers were observed among female workers (38). Up to 31 December, 1991, a total of 118 cancers had occurred in the cohort. A significantly increased SIR was observed for cancer of the nose and nasal sinuses in men, three cases were observed versus 0.36 expected, yielding an SIR of 832 (95% CI: 172-2430). Applying a 10 year latency period in cohort members exposed to 2000 $\mu\text{g nickel/m}^3$, the SIR was 1,080 (95%CI: 131-3,900) (38). It was determined that there was an overall increased risk of lung cancer and a significantly increased risk of cancer of the nose and nasal sinuses, which may be caused by exposure to nickel or cadmium or a combination of both

exposures (38). Unfortunately, this study did not examine its results based on time periods, only exposure rates, so it is unclear whether the risks were more significant in early operations. The exposure assessment procedure showed that there were no known confounders present in the work environment of the battery plant.

An historical cohort study of mortality rates of workers involved in the production of stainless and alloyed steel examined all male and female workers ever employed in the factory for at least one year between 1 January 1968 and 31 December 1991 (n = 4,288 males and 609 females) (39). A significantly lower than expected overall mortality was observed (649 deaths; SMR = 91; 95% CI: 84-98). Also, there was no statistically significant SMR observed for mortality for lung cancer (54 deaths; SMR = 119; 95% CI: 88-155) (39). While there were no statistically significant findings for exposure to metals (and/or their compounds) and lung cancer, there were statistically significant findings observed for lung cancer that involved simultaneous exposure to polycyclic aromatic hydrocarbons (PAHs) and silica (39), with ORs (odds ratios) of 195 (95% CI: 103-372) and 247 (95% CI: 128-477), respectively (39). While there was statistically significant (relative) risks observed for simultaneous exposure to polycyclic aromatic hydrocarbons and silica, the study ultimately failed to detect any relationship between lung cancer and exposure to iron, chromium, or nickel (and/or their compounds).

Accident and Injuries at Work

Accidents and injuries in the work place are an area of concern and many studies have been carried out to place a focus on this topic. A cohort study by Cohen et al. in

Washington State analyzed work-related deaths between 1998-2002. They found that an average of 87 workers were killed each year with motor vehicle and machinery related incidents accounting for 33% and 14% of the incidents, respectively (72). Furthermore, the study found that agriculture, forestry, fishing, hunting, and mining (n = 87), and construction (n = 83) had the most fatalities (72).

A 2004 multi-national cohort study from Ahn et al. compared the unintentional fatal occupational injuries in the Republic of Korea and the United States. For the mining industry, it was found that the United States and the Republic of Korea had 586 and 135 unintentional fatal occupational injuries, respectively (73). The study then estimated the fatal occupational injury rate per 100 000 worker years in 1998 and annual rate of change for the years 1998–2001 and found that the mining industry had the only increase in fatal occupational injury for both countries, those being 9.90% and 11.75% for Korea and the United States, respectively (73). Furthermore, the study analyzed the data by categorizing the top five unintentional fatal injury causes by industry with proportion of deaths within the industry for Korea and the United States, and found the following results for mining (73):

Industry	Korea		United States	
	Injury	Deaths (%)	Injury	Deaths (%)
Mining	Fire/explosion	9 (6.7)	Fire/explosion	76 (13.0)
	Motor vehicle collision	6 (4.5)	Falls	54 (9.2)
	Electric current	3 (2.2)	Electric current	19 (3.2)
	Total	135 (100)	Total	586 (100)

Falls	1082 (55.0)	Falls	1558 (33.9)
Contact with object	433 (22.0)	Motor vehicle collision	1166 (25.3)

Another retrospective cohort study carried out in the United States by Stout et al. stated that: *“Over the past 100 years, dramatic reductions in workplace injuries and deaths have occurred. Recent trends continue to show reductions in numbers and rates of fatal occupational injuries.”* This holds true to the mining industry as well, with their data supporting this statement outlined in the graphic below (74):

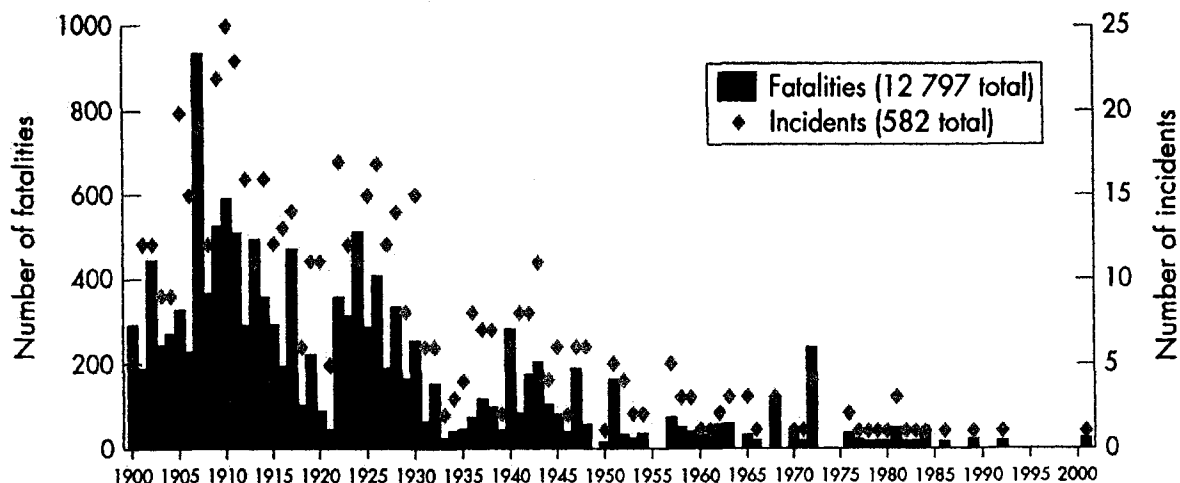


Fig 7: Mining disaster incidents and fatalities, 1900–2001

However, the study concluded that “the occupational injury research community cannot effectively evaluate and implement prevention strategies on its own; neither can industry, nor employers, nor workers at risk” and much larger and more extensive research is needed to effectively address the occupational injury field (74).

A cohort study conducted from 1992 to 1998 in the United States by Valent et al. examined fatal work-related inhalation of harmful substances. These investigators found

that approximately 65 people die because of a work-related inhalation in the United States each year and that this mode of exposure causes more occupational deaths than any other exposure to harmful substances (75). Furthermore, industry-specific preventive measures should be implemented to address exposure to industry-specific substances, with the mining industry being of note. Data from the study analyzing fatal occupational inhalation of substances by industry showed that the mining industry had 34 deaths a year on average, which translated to 6.64 deaths per 1,000,000 worker-years, more than double the rate of any other industry studied with the exception of the petroleum and coal products industry (4.57 deaths per 1,000,000 worker-years) (75).

Cancer and Disease in Sudbury and Northeastern Ontario

According to the Northern Health Information Partnership (drawn from the Canadian Community Health Survey (CCHS), the NHIP CCHS Interactive Query System (2002), the NHIP Mortality and PYLL Rates 2.1 (2000) and Hospital Morbidity Rates 2.2 programs (2000, using data from the Canadian Institute for Health Information, Vital Statistics and the Ontario Ministry of Health and Long-Term Care [MOHLTC] Provincial Health Planning Database): *“The health status of Northern Ontario residents is generally poorer than that of Ontario residents. This is further emphasized by the higher prevalence of health risk behaviours, such as smoking and binge drinking in Northern Ontario. Specifically, the overall mortality rate is higher and the impact of a number of diseases, such as cardiovascular disease and injuries/poisonings is significantly greater.”* For cancer, NHIP states that *“it is apparent that Northern Ontario has increased prevalence of risk factors, coupled with increased cancer incidence and mortality, and*

decreased five-year relative survival.”(40) As can be seen in the figure below the leading causes of mortality in Northern Ontario are diseases of the circulatory system, neoplasms, and diseases of the respiratory system (from the year 2000). Also, the overall mortality rate in Northern Ontario is higher than the provincial rate (7.24 vs. 6.2 per 1000, from the year 2000) (40).

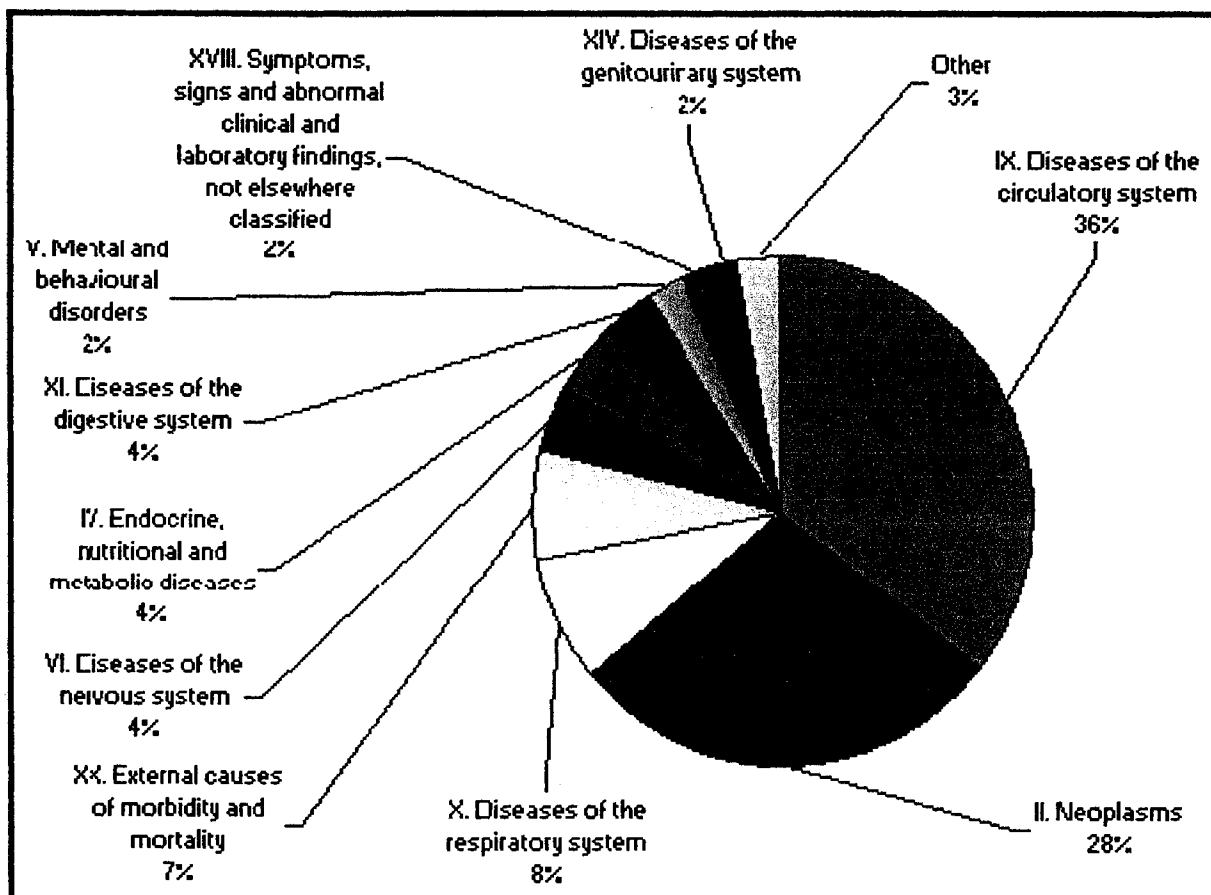


Fig. 8: Leading Causes of Mortality, 2000, by ICD-10 Chapter, Northern Ontario Total n=7620, Overall s-rate of mortality 7.24 per 1000. (40)

Furthermore, The Sudbury District Health unit has compiled information about health concerns for Sudbury and the surrounding region (as compared to the rest of Ontario and Canada) (41). The table below highlights some specific areas of interest (age-standardized rates per 100,000 population for 1996) (41).

Canada	Ontario	Sudbury & DHU Area	Indicator
861.80	845.50	982.10	Male: Total mortality (International Classification of Diseases 9 001-799, E800-E999)
526.30	527.50	611.20	Female: Total mortality (International Classification of Diseases 9 001-799, E800-E999)
185.70	180.50	202.50	Total: All cancer deaths (International Classification of Diseases 9 140-208)
235.30	226.80	260.00	Male: All cancer deaths (International Classification of Diseases 9 140-208)
151.90	149.60	163.60	Female: All cancer deaths (International Classification of Diseases 9 140-208)
49.20	44.30	54.30	Total: Lung cancer deaths (International Classification of Diseases 9 162)
72.00	63.80	77.50	Male: Lung cancer deaths (International Classification of Diseases 9 162)
32.50	30.00	36.60	Female: Lung cancer deaths (International Classification of Diseases 9 162)

One population-based descriptive epidemiology study conducted by Conlon et al. reported the cancer incidence and mortality experience of northeastern Ontario residents from 1991-1998 (42). They concluded that “*for both males and females, the cancer incidence and mortality experience of residents of northeastern Ontario was significantly higher than would be expected based on Ontario cancer rates, overall, and for a number of individual sites.*”(42) Tables A and B, below present the statistically significant results.

Table A: Male cancer incidence in northeastern Ontario, 1991 – 1998

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
140-208	All sites except non-melanotic skin	13043	11963.19	109.03	107.16-110.91	**

140-145	Lip and oral cavity	323	271.69	118.89	106.27	132.58	**
150	Esophagus	219	165.64	132.22	115.28	150.94	**
151	Stomach	380	334.06	113.75	102.60	125.79	*
153,154	Colorectal	1910	1607.95	118.78	113.52	124.23	**
157	Pancreas	293	259.76	112.79	100.25	126.48	*
161	Larynx	210	179.34	117.09	101.79	134.05	*
162	Trachea, bronchus and lung	2551	2083.69	122.43	117.72	127.27	**
186	Testis	93	122.19	76.11	61.43	93.24	**
204-208	Leukemia	424	371.52	114.12	103.52	125.52	**

ICD9 = International Classification of Diseases, Ninth Revision

O = Observed number of cases

SIR = Standardized incidence ratio

* = indicates statistical significance at $p < 0.05$

E = Expected number of cases

CI = Confidence interval

** = indicates statistical significance at $p < 0.01$

Table B: Male cancer mortality in northeastern Ontario, 1991 – 1998

ICD-9	CAUSE	O	E	SMR	95% CI	SIG	
140-208	All sites except non-melanotic skin	6553	5780.81	113.36	110.63	116.14	**
150	Esophagus	226	177.86	127.06	111.04	144.75	**
151	Stomach	246	213.66	115.14	101.20	130.46	*
153, 154	Colorectal	682	612.89	111.28	103.08	119.95	**
161	Larynx	98	72.02	136.08	110.48	165.84	**
162	Trachea, bronchus and lung	2168	1734.66	124.98	119.78	130.36	**
200	Lymphosarcoma	18	10.44	172.34	102.14	272.37	*

ICD9 = International Classification of Diseases, Ninth Revision

O = Observed number of cases

SIR = Standardized incidence ratio

* = indicates statistical significance at $p < 0.05$

E = Expected number of cases

CI = Confidence interval

** = indicates statistical significance at $p < 0.01$

As northeastern Ontario has historically been a region of industry it will be important for studies on cancer incidence and mortality in the workplace to be of continual focus in this region in an effort to understand the reasons for the elevation and how to lessen the factors affecting them. Therefore the goal of this study is to determine whether employees of Xstrata Nickel are at increased risk of any specific cancers or causes of death compared to the Ontario population.

Study Methodology

a) Cohort Ascertainment and Study Inclusion Criteria

This is an historical prospective cohort study. Inclusion criteria for the study included males, aged 14 and over, who worked for Falconbridge's Ontario Division (now Xstrata Nickel) at Sudbury for at least six months, from January 1st, 1964 or had worked for at least six months and were on active pension from January 1st, 1964 onwards, until Dec 31st, 2001. The six month minimum as a criterion was selected because it has been utilized in previous studies and avoids the study of employees with very short employment and exposure assessment periods. It also avoids potentially more problematic follow-up for more transient employees.

New hire nominal roll and work history information were supplied for the period from 1989 onwards, electronically, by Falconbridge Ltd.'s information systems personnel in Sudbury and were appended to the previous nominal roll file obtained from Statistics Canada

The current nominal roll files included information about: surname, given names, birthdate, social insurance number, company reported vital status, whether the person was actively employed or on pension, marital status, date of first work, date of last work, date last known alive, and date of death.

The work history file contained the following information: department, occupational codes, beginning date for each occupation (job), union status, termination codes, and last work dates. Nominal and work history files were merged and statistical analysis group codes (underground, smelter, mill, service, administration, office-clerical, production-maintenance, and sinter employees) were added by a company personnel employee, approved by both the company and union .

A great deal of time was spent undertaking data quality control, including such procedures as the removal of duplicate records and removal of persons under 14 years-of-age. An age cut-off of 14 years seemed reasonable for the early periods of the study and given the small number of people who worked before this age. Persons who worked in more than one department on the same day, had their work experience split across both departments.

After ensuring data quality and encrypting the nominal roll file, Cancer Care Ontario was provided with the nominal file to conduct a record linkage, utilizing ICD9 (Appendix A), for individual mortality and cancer incidence. Subsequently they were provided with the merged nominal and work history file, which they anonymized (nominal information was deleted and replaced with a random number for individual workers identifiable only by Cancer Care Ontario) and merged with their cancer incidence and mortality information which was then returned to the study group

Analysis for this study was done: 1) overall for those with less than 15 years since first hire, those with 15 or more years since first hire, 2) categories for duration of employment (i.e., 0.5 - 14 years, 15 - 29 years and 30+ years) were created using the total days worked at Falconbridge minus days accounted for as termination codes (e.g., long-term illness, on pension, layoffs), and 3) decade of first work (or first hire) from 1928 onwards. The periods less than 15 years since first hire and 15 or more years since first hire refer to health outcomes in those periods and may include work in other places than at Xstrata Nickel. Whereas, for duration of employment those periods are for work done at Xstrata Nickel

For cause of death, only the immediate cause was listed, and for cancer primary causes of cancer were listed, although a person could have multiple primary cancers.

b) Ascertainment of Cancer Incidence and Mortality

For all causes of mortality Cancer Care Ontario utilized the Ontario Mortality Database (OMB) and for cancer incidence and mortality, The Ontario Cancer Registry information was employed. The Ontario Cancer Registry is a computerized database of information on all Ontario residents who have been newly diagnosed with cancer or who have died of cancer. All new cases of cancer are registered, except non-melanoma skin cancer. More than 1.3 million cases have been registered for the interval 1964-2002. Specifically for this study, cancer follow-up occurred between January 1, 1964 and December 31, 2001 as the Ontario Cancer Registry only has information dating from 1964. December 31, 2001 was used as the cut off date as our data only extends to that time. The Cancer Act

provided a legal mandate for Cancer Care Ontario to establish and maintain a cancer registry. Under the Cancer Act, any information about a registered case must be kept confidential and not be used or disclosed for any purpose other than for compiling statistics or carrying out medical or epidemiological research (44).

The OCR used record linkage to determine vital status of the subjects. The proportion of cancers of all sites for which the Ontario Cancer Registry (OCR) reports microscopic verification is 83%, somewhat below that reported by active registries (95%) (43). The estimated completeness of reporting was high, over 95% (43). The proportion of death certificate only cases was quite low, at less than 2% (43). Approximately 3% of cases lacked specification of the census division (county) of residence at time of diagnosis, although there is substantial variation by site (43). For cancers with high rates of hospitalization and mortality (e.g. lung and pancreas), the proportion was low, at 2% (43). For cancers commonly managed on an out-patient basis, and frequently registered at the OCR by pathology reports only (e.g. lip and melanoma), the proportion was substantially higher, at about 11% (43).

For both mortality and cancer incidence analysis, SMRs and SIRs with 95% confidence limits were calculated for all those who had six months or more of work experience at Xstrata Nickel's Ontario Division at Sudbury. Overall mortality and cancer incidence was examined for employees with less than 15 years since first hire and employees with 15 years or more since first hire; again, it must be noted that workers in these categories may have been employed elsewhere during these periods, outside of Xstrata Nickel

operations. Overall data can not be provided due to the possibility of small numbers identifying particular individuals possible. Further subdivisions were then performed to examine mortality and cancer incidence based on union and non-union, decades of first work (e.g. starting January 1st and ending December 31st the decades are defined as 1928 = 1928 to 1939, 1940 = 1940 to 1949, 1950 = 1950 to 1959, 1960 = 1960 to 1969, 1970 = 1970 to 1979, 1980 = 1980 to 1989, 1990 = 1990 to 1999), Job Category (Category 1 = underground mines, Category 2 = milling, Category 3 = service, Category 4 = smelter, Category 5 = administration, Category 6 = Falconbridge sinter plant, Category 7 = office clerical, Category 8 = production and maintenance) and duration of employment.

c) Record Linkages

The Xstrata Nickel cohort, consisted of 12,942 individuals, and involved two record linkages performed by Automatch software from Matchware Technologies, Inc. The mortality file linkage (where the cohort was linked to Ontario Mortality Database containing 1,438,259 death certificates) was performed first (Karen Hoffman, personal communication). It included all male deaths from 1964 employed in the linkage from the nominal file onwards up to December 31st, 2001. The data fields used were: surname, first given name, second given name, social insurance number, birth year, birth month and birthdate . As done in previous studies of this cohort, this study examined the underlying causes of death since the cost of acquiring contributing causes of death was cost prohibitive.

The cancer incidence linkage (where the cohort was linked to cancer incidence file containing 637,077 patients) was performed secondarily. All Ontario males diagnosed with any invasive neoplasm (except non-melanoma skin cancer) over the period from 1964 to December 31st, 2001 were selected included. The data fields used from the nominal file were: surname, first given name, second given name, birth year, birth month and birthdate. The death date and Ontario Cancer Registry group number obtained through the mortality linkage were used as passes in the second linkage, if the cohort member was involved in a link to the mortality file.

Five passes were used for each mortality and cancer incidence linkages. A NYSIIS (New York State Identification and Intelligence System Algorithm code was generated for each surname and it was used in two of the passes. NYSIIS codes convert a name to a phonetic coding of up to six characters, and allow names with minor variations in spelling to be grouped together (76).

The following passes were used for the Mortality linkage: SIN (social insurance number), death date: last date on the Falconbridge File, NYSIIS combined with the birthdate, NYSIIS, birthdate.

The following passes were used for the cancer incidence file linkage: Ontario Cancer Registry patient group number (to match records which linked to the mortality file with the related cancer patient), death date (identified by the Mortality linkage), and NYSIIS combined with the birthdate, NYSIIS, and birthdate. Upon completion of the clerical

review: 2,814 links to the mortality file were deemed to be definite links and 1,531 links to the cancer incidence file were deemed to be definite.

All of the clerical pairs were reviewed by an experienced researcher who performs the Clerical Review Process for all linkages to the Ontario Cancer Registry, using consistent methods. The third given name on the death certificate was considered when resolving questionable links where the First and/or Second Given Name disagreed. All pairs which agreed on NYSIIS but had different birthdates were reviewed. The most difficult links to resolve were links that differed on birthdate. If the names were in agreement and the birthdates did not entirely agree and there were no other fields available for consideration. Otherwise, if the birthdates were too far off, or the names were very common or the reviewer was uncertain, the records were considered to be non matches.

The results of the two linkages combined, revealed 1,020 cohort members linked to both the cancer incidence and mortality files, 1,794 cohort members linked to the mortality file only and 511 cohort members linked to the cancer incidence file only.

d) Statistical Analysis

The analysis involved comparing the observed number of deaths or new cancers in this group of employees to the number expected in the same period. It was then determined if the study subjects were experiencing the same mortality rate or cancer rate from a particular cause as the Ontario population. The calculation of the expected number of deaths or cancers takes into account both age and the years in which they were followed.

According to the Dictionary of Public Health, an SMR (Standardized Mortality Ratio) is “the ratio of the number of deaths in a study population to the number that would be expected if this population had the same distribution as a standard population” and an SIR (Standardized Incidence Ratio) is “the ratio of the incident number of cases of a condition in the study population to the number that would be expected if the study population had the same incidence rate as a standard population.” (67) An SMR (or SIR) of 100 would occur if the observed number of deaths (or new cancers) matched exactly the expected number. SMRs (or SIRs) less than 100 imply that the cohort has experienced less mortality (or new cancers) than would be typical for the Ontario population; conversely, SMRs (or SIRs) greater than 100 imply that the cohort has experienced more deaths (or new cancers) than expected. Also important to note is that the numbers can vary somewhat due to chance and are subject to a larger percentage of random variation in the event of low numbers of observed and expected deaths or new cancers (67). Therefore, in order to determine if an SMR or SIR greater than 100 represents evidence of a true excess risk or could be attributed to natural variation, probability values (p-values) and confidence intervals (the range in which the true SMRs or SIRs are likely to fall) are used. According to The Dictionary of Public Health, probability is “a measure that ranges from zero to 1 of the likelihood that a random event will occur or the degree to which a statement or assumption is true” (67). This must lie between 0 and 1: the probability is 0 if the event is certain not to occur, 1 if it is certain to occur.” (67). The Dictionary of Public Health describes confidence intervals as “the range within which the true value of a variable such as a mean, proportion, or rate lies, with a probability that can be calculated using statistical methods. The end points of the

confidence interval are the confidence limits. Confidence intervals indicate how precisely the results of an analysis based on a particular population sample approach the true value of proportions, rates, etc., in that sample.” (67) A simple example explaining how to interpret an SMR/SIR follows: An SMR of 217 (95% CI: 165-301) for possibly job-related accidents would mean that deaths from possibly job-related accidents are 117% (217-100) higher than for the population to which the results are being compared and the result is statistically significant. An SIR of 125 (95% CI: 105-195) for lung cancer would indicate that there is a statistically significant excess of lung cancer that is 25% (125-100) higher than in the reference population. Caution should always be used when interpreting standardized mortality and incidence ratio data and the number of observed and expected deaths or new cancer cases, SMR/SIR magnitude, and 95% confidence interval should be carefully considered (the confidence interval is related to the p-value and a p-value under 0.05 means the confidence interval does not include 100).

The International Classification of Diseases 9th revision (ICD9) was utilized in this study, which includes all cancer sites collectively as well as specific cancer sites (Appendix A)). The mortality analysis included the following ICD9 categories: deaths from accidents, violence or poisonings which are presented in a collective total and have also been subdivided into six subgroups of accidental deaths: road, rail or air; boating or swimming; possibly job-related; suicide, including possible suicide; assaults; and other accidents (Appendix A).

For privacy and confidentiality reasons, study results have been suppressed for both incidence and mortality data when the observed cell size was less than six and if cumulative work experience was less than six months.

Data that appear in **red** denote statistically significant **increases** in cancer incidence or mortality, while data that appear in **blue** denote statistically significant **decreases** in cancer incidence or mortality.

e) Confidentiality

All individual data were held in locked files in locked rooms when not in use. All health data returned by the Ontario Cancer Registry were coded so as to be totally anonymized.

Study Results

The Xstrata Nickel study is an historical prospective cohort study that included 10,253 males that worked for Xstrata Nickel's Ontario Division at Sudbury. The cohort included employees who worked six months or more and who were alive and working during the follow-up period, which spanned from January 1, 1964 to December 31, 2001, and who were 14 years of age or older (n = 10,253). Arbitrary age cut-off for the study was set to 14 years of age at first hire due to that being the lowest age represented primarily during the period of World War II to shortly thereafter.

Table A: Demographic characteristics of employees eligible for inclusion in the analysis with an age between 14 to 17 at first hire

Age at first hire (14 to 17 years old)

		Frequency	Percent
Valid	1900 -1959	211	63.2
	1960 - 1969	84	25.1
	1970 onward	39	11.7
	Total	334	100.0

From the 12,942 individuals in the Xstrata Nickel cohort, 10,253 men were eligible for this study. The following table categorizes the 10,253 individuals into different demographic groupings:

Table B: Demographic characteristics of employees eligible for inclusion in the analysis (n = 10,253 and total mortality = 1,984)

Overall Age Categories

Statistics	Age at First Work	Age at Last Work
Mean	25.7	40.3
Median	24.00	38.38
Mode	20	65
S.D.	6.897	14.268
Range	14 - 67	19 - 73

Table C: Duration of Employment categories for employees eligible for inclusion in the analysis minus termination periods (n = 10,253)

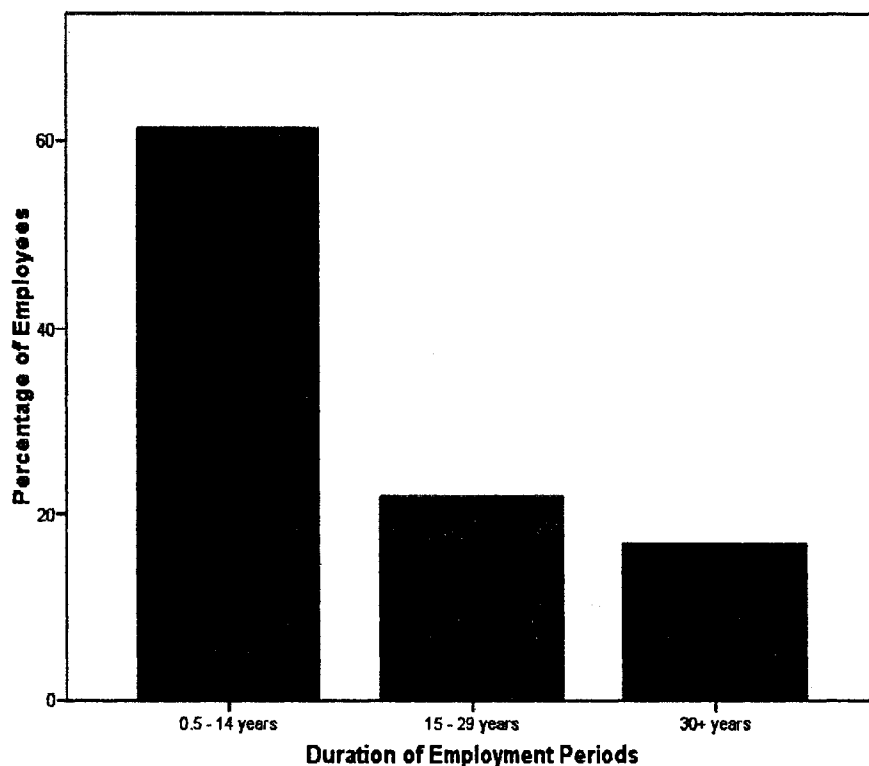
Duration of Employment		Number	Percentage	Percentage
Valid	<0.5 yrs	4	0.0	0.0
	'sinter'			
	0.5 - 14 yrs	6287	61.3	61.3
	15 - 29 yrs	2250	21.9	83.3
	30+ yrs	1712	16.7	100.0
	Total	10,253	100.0	

'sinter' = ever sinter employees included despite less than six month inclusion criteria

For the follow-up period there were 1,984 deaths, therefore 19.3% of the cohort died and there were 1,127 incident cancers, therefore 10.9% developed cancer.

Figure 1 also provides a graphical interpretation of the categorization of the cohort by duration of employment

Figure 1: Overall Duration of Employment for Included Employees (n=10,253)



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Cancer Incidence

For employees with less than 15 years since first hire, a significantly decreased incidence of cancer was observed for all cancer sites (SIR=75, 95% CI:59-94; O=75, E=99.87) (Table 1). For employees with 15 years or more since first hire, a significantly decreased cancer incidence was observed for all cancer sites (SIR=86, 95% CI:81-92; O=1,052, E=1,219.67). A significantly decreased incidence of pharynx and ill defined upper aero-digestive cancers, malignant melanoma of the skin, and prostate cancer were also observed (SIR=45, 95% CI:19-89; O=8, E=17.17, SIR=45, 95% CI:26-72; O=17; E=37.56, and SIR=73 95%CI:63-85 ; O=185, E=252.30, respectively) (Table 2).

Unionized employees with less than 15 years since first hire displayed a significantly decreased incidence for all cancer sites (SIR=76, 95% CI:59-96; O=70, E=91.76) (Table 3), while unionized employees with 15 years or more since first hire displayed a significantly decreased incidence for all cancer sites (SIR=88, 95% CI:82-93; O=1,016, E=1,157.93), pharynx and ill defined upper aero-digestive cancers(SIR=47, 95% CI:20-

93; O=8, E=16.95), malignant melanoma of the skin (SIR=44, 95% CI:25-72; O=16, E=35.99), and prostate cancer (SIR=76, 95% CI:65-87; O=180, E=238.32) (Table 4).

Non-unionized employees with both less than 15 years, and 15 years or more since first hire, displayed no significant results.

For unionized employees analysis was conducted by duration of employment for those with 0.5 to 14 years employment. Significantly decreased incidences were observed for all cancer sites (SIR=79, 95% CI:72-87; O=454, E=572.34), colorectal cancer (SIR=76, 95% CI:58-98; O=58, E=76.30), malignant melanoma of the skin (SIR=35, 95% CI:16-66; O=9, E=26), and for prostate cancer (SIR=66, 95% CI:51-85; O=64, E=96.37) (Table 5). For unionized employees with employment of 15 to 29 years, a significantly increased incidence was observed for lung cancer (SIR=128, 95% CI:107-153; O=121, E=94.19), and a significantly decreased incidence was observed for prostate cancer (SIR=78, 95% CI:61-98; O=74, E=95.24) (Table 6). Unionized employees with employment of 30 years or more displayed no significant results.

Employees whose decade of starting work was 1940 displayed a significant increase for lung cancer (SIR=144, 95% CI:108-188; O=53, E=36.81) (Table 7). Employees whose decade of starting work was 1950-1959 displayed a significant decrease in all cancer sites (SIR=81, 95% CI:72-89; O=358, E=444.20), as well as for prostate cancer (SIR=69, 95% CI:54-88; O=67, E=96.53) (Table 8). For employees whose decade of starting work was 1960-1969, a significant increase in lung cancer (SIR=129, 95% CI:102-161; O=79,

E=61.23) and a significant decrease in malignant melanoma of the skin (SIR=48, 95% CI:21-94; O=8, E=16.69) (Table 9) were observed. Employees whose decade of starting work was 1970-1979 displayed a significant decrease in all cancer sites (SIR=74, 95% CI:62-88; O=129, E=173.83) as well as for prostate cancer (SIR=56, 95% CI:31-94; O=14, E=25.02) (Table 10). No significant results were observed for the 1928-1939, 1980-1989 and 1990-1999 periods.

Non-unionized underground mine employees with less than 15 years since first hire displayed significantly decreased incidence at all cancer sites (SIR=49, 95% CI:22-93; O=9, E=18.45) (Table 11). Those with 15 years or more since first hire displayed no significant results.

Non-unionized administration employees with 15 years or more since first hire displayed significantly decreased incidence at all cancer sites (SIR=73, 95% CI:58-91; O=82, E=111.94) (Table 12).

Non-unionized milling, service, smelter, office clerical, and production and maintenance employees with less than 15 years and 15 years or more since first hire all displayed no significant results.

Unionized underground mine employees with less than 15 years since first hire displayed significantly decreased incidence at all cancer sites (SIR=73, 95% CI:54-96; O=50, E=68.69) (Table 13). Unionized underground mine employees with 15 years or more

since first hire displayed significantly increased incidence for lung cancer (SIR=122, 95% CI:103-143; O=153, E=125.63) and significantly decreased incidence for all cancer sites (SIR=,89 95% CI:82-96; O=584, E=657.72), malignant melanoma of the skin (SIR=49, 95% CI:23-90; O=10, E=20.51), prostate cancer (SIR=75, 95% CI:61-91; O=101, E=135.54), and bladder and other urinary system cancers(SIR=65, 95% CI:43-96; O=26, E=39.83) (Table 14).

Unionized milling employees with 15 years or more since first hire displayed significantly decreased incidence for all cancer sites (SIR=82, 95% CI:69-96; O=148, E=180.54) (Table 15). Those with less than 15 years since first hire displayed no significant results.

Unionized service employees with 15 years or more since first hire displayed significantly decreased incidence for all cancer sites (SIR=85, 95% CI:75-95; O=276, E=325-99), colorectal cancer (SIR=63, 95% CI:42-90; O=29, E=46.15), and bladder and other urinary system cancers (SIR=50, 95% CI:24-92; O=10, E=19.89) (Table 16). Those with less than 15 years since first hire displayed no significant results.

Unionized smelter employees with less than 15 years since first hire displayed significantly decreased incidence at all cancer sites (SIR=55, 95% CI:33-86; O=19, E=34.35) (Table 17). Unionized smelter employees with 15 years or more since first hire displayed significantly decreased incidence for prostate cancer (SIR=67, 95% CI:49-91; O=43, E=63.92) (Table 18).

Unionized office clerical employees with less than 15 years since first hire displayed significantly decreased incidence at all cancer sites (SIR=54, 95% CI:29-90; O=14, E=26.08) (Table 19). Those with 15 years or more since first hire displayed no significant results.

Unionized production and maintenance employees with 15 years or more since first hire displayed significantly decreased incidence at all cancer sites (SIR=78, 95% CI:61-97; O=77, E=98.89) (Table 20). Those with less than 15 years since first hire displayed no significant results.

Unionized administration and Xstrata Nickel sinter plant employees with less than 15 years and 15 years or more since first hire both displayed no significant results.

Underground mine employees with 0.5 to 14 years of employment displayed significantly decreased incidence at all cancer sites (SIR=78, 95% CI:26-71; O=289, E=369.67) and for prostate cancer (SIR=62, 95% CI:44-85; O=40, E=64.42) (Table 21). Those employees that had 15 to 29 years of employment displayed significantly increased incidence for lung cancer (SIR=136, 95% CI:106-172; O=69, E=50.77) and brain and other nervous system cancers (SIR=219, 95% CI:105-403; O=10, E=4.56) (Table 22).

Underground mine employees with 30 years or more employment displayed no significant results.

Employees who worked in the mill who had 0.5 to 14 years of employment displayed significantly decreased incidence at all cancer sites (SIR=78, 95% CI:63-95; O=98, E=125.95) and for prostate cancer(SIR=58, 95% CI:31-99; O=13, E=22.41) (Table 23). Employees who worked in the mill who had 15 to 29 years of employment displayed significantly decreased incidence at all cancer sites (SIR=55, 95% CI:32-86; O=18, E=32.98) (Table 24). Employees who worked in the mill who had 30 or more years of employment displayed no significant results.

Employees who worked in service who had 0.5 to 14 years of employment displayed significantly decreased incidence at all cancer sites (SIR=79, 95% CI:67-92; O=162, E=205.84) (Table 25). Employees who worked in service who had 15 to 29 and 30 or more years of employment displayed no significant results.

Employees who worked in the smelter who had 0.5 to 14 years of employment displayed significantly decreased incidence at all cancer sites (SIR=77, 95% CI:65-90; O=151, E=196.96) and for prostate cancer (SIR=55, 95% CI:33-84; O=20, E=36.63) (Table 26). Employees who worked in the smelter who had 15 to 29 and 30 or more years of employment displayed no significant results.

Employees who worked in administration who had 0.5 to 14 years of employment displayed significantly decreased incidence at all cancer sites (SIR=65, 95% CI:50-83; O=66, E=101.28) and for lung cancer (SIR=52, 95% CI:25-95; O=10, E=19.36) (Table

27). Employees who worked in administration who had 15 to 29 and 30 or more years of employment displayed no significant results.

Employees who worked in office clerical work who had 15 to 29 years of employment displayed significantly decreased incidence at all cancer sites (SIR=52, 95% CI:31-83; O=18, E=34.38) (Table 28).

Production and maintenance employees along with Xstrata Nickel sinter plant employees did not display any significant results for any durations of employment examined.

Underground mine employees that commenced work in the 1940-1949 decade displayed significantly increased incidence for lung cancer (SIR=173, 95% CI:125-234; O=42, E=24.26) and significantly decreased incidence for prostate cancer (SIR=58, 95% CI:32-98; O=14, E=23.97) (Table 29). Underground mine employees that commenced work in the 1950-1959 decade showed significantly decreased incidence for all cancer sites (SIR=84, 95% CI:72-97; O=184, E=219.81) and for prostate cancer (SIR=65, 95% CI:44-92; O=31, E=47.88) (Table 30). Underground mine employees that commenced work in the 1970-1979 decade displayed significantly decreased incidence at all cancer sites (SIR=74, 95% CI:60-91; O=93, E=125.55) (Table 31). Underground mine employees that commenced work in the 1928-1939, 1960-1969, 1980-1989 and 1990-1999 decades displayed no significant results.

Employees who worked in the smelter that commenced work in the 1950-1959 decade displayed significantly decreased incidence at all cancer sites (SIR=82, 95% CI:67-98; O=108, E=132.42) (Table 32). Employees who worked in the smelter that commenced work in the 1960-1969 decade displayed significantly decreased incidence for prostate cancer (SIR=45, 95% CI:16-98; O=6, E=13.33) (Table 33). Employees who worked in the smelter that commenced work in the 1928 -1939, 1940-1949, 1970-1979, 1980-1989, and 1990-1999 decades displayed no significant results.

Employees that worked in administration as well as Xstrata Nickel sinter plant employees displayed no significant results for any start decades.

Production and maintenance employees that commenced work in the 1940-1949 decade displayed significantly increased incidence for lung cancer (SIR=375, 95% CI:162-739; O=8, E=2.13) (Table 34). Production and maintenance employees that commenced work in the 1950-1959 decade displayed significantly decreased incidence at all cancer sites (SIR=59, 95% CI:69-92; O=20, E=33.62) (Table 35). Production and maintenance employees that commenced work in the 1928 - 1939, 1960-1969, 1970-1979, 1980-1989, and 1990-1999 decades displayed no significant results.

Cancer Mortality

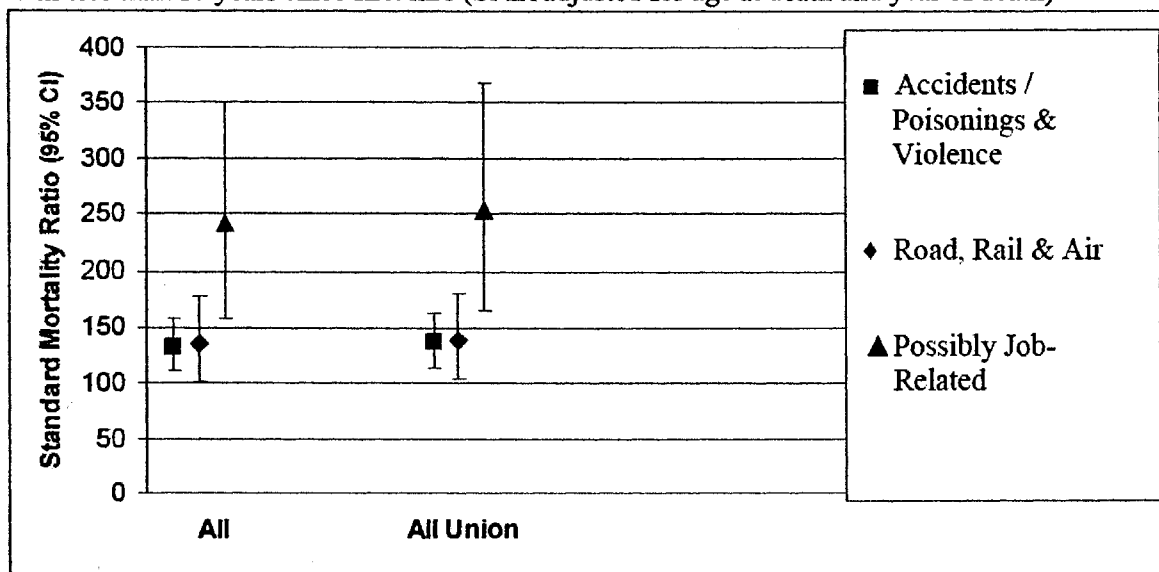
For employees with less than 15 years since first hire, a significant increase in deaths caused by accidents, poisonings, and violence (SMR=133, 95% CI:111-158; O=128, E=96.08) was observed as well as significant increases in deaths caused by rail, road, and

air travel accidents (SMR=136, 95% CI:102-177; O=54, E=39.83), and possibly job-related deaths (SMR=241, 95% CI:159-351; O=27, E=11.20) (Table 36). The term “possibly job-related” refers to types of accidental death typically associated with any workplace; however, whether it actually occurred on the job unknown to the person concluding the cause of death (refer to appendix A for detail on ICD9 classifications). For employees with 15 years or more since first hire, a significant increase in deaths caused by accidents, poisonings, and violence (SMR=123, 95% CI:104-144; O=150, E=122.05) was observed. Significantly decreased deaths were observed for all causes (SMR=91, 95% CI:87-96; O=1,744, E=1,906.41); infective and parasitic diseases (SMR=45, 95% CI:23-79; O=12, E=26.50); endocrine, nutritional, and metabolic diseases (SMR=58, 95% CI:39-82; O=31, E=53.62); nervous system sense and organ diseases (SMR=46, 95% CI:27-73; O=17, E=37.20); respiratory diseases (SMR=82, 95% CI:67-100; O=106, E=128.65); digestive diseases (SMR=66, 95% CI:50-86; O=57, E=86.18); symptoms or ill-defined conditions (SMR=60, 95% CI:36-94; O=19, E=31.63); prostate cancer (SMR=68, 95% CI:46-96; O=31, E=45.63); and cirrhosis of the liver (SMR=63, 95% CI:43-91; O=30, E=47.27) (Table 37).

Unionized employees with less than 15 years since first hire displayed a significant increase in deaths from accidents, poisonings, and violence (SMR=137, 95% CI:114-163; O=126, E=92.23); road, rail, and air transport accidents (SMR=138, 95% CI:103-180; O=53, E=38.51); and possibly job-related deaths (SMR=253, 95% CI:166-368; O=27, E=10.69) (Table 38). Unionized employees with 15 years or more since first hire displayed a significant increase in deaths from accidents, poisonings, and violence

(SMR=124, 95% CI:105-146; O=146, E=117.44); and significant decreases in deaths from all causes (SMR=93, 95% CI:89-98; O=1686, E=1806.19); infective and parasitic diseases (SMR=47, 95% CI:24-82; O=12, E=25.48); endocrine, nutritional, and metabolic diseases (SMR=57, 95% CI:38-82; O=29, E=50.72); nervous system sense and organ diseases (SMR=43, 95% CI:24-70; O=15, E=35.12); digestive diseases (SMR=67, 95% CI:51.87; O=55, E=82); symptoms or ill-defined conditions (SMR=63, 95% CI:38-98; O=19, E=30.21); and cirrhosis of the liver (SMR=64, 95% CI:43-92; O=29, E=45.16) (Table 39 and Figure 2 below for accident categories).

Figure 2: Mortality by significant accident categories for all employees & all union workers with less than 15 years since first hire (SMR adjusted for age at death and year of death)



Non-unionized employees with 15 years or more since first hire displayed significant decreases in death for all causes (SMR=73, 95% CI:65-82; O=281, E=383.78); circulatory disease (SMR=79, 95% CI:66-94; O=127, E=161.58); and respiratory diseases (SMR=63, 95% CI:38-98; O=19, E=30.17) (Table 40). Those with less than 15 years since first hire displayed no significant results.

Employees that were unionized were analyzed by duration of employment and those with 0.5 to 14 years of employment displayed significantly increased deaths for accidents, poisonings, and violence (SMR=137, 95% CI:119-157; O=200, E=145.94); rail, road, and air transport accidents (SMR=138, 95% CI:108-175; O=70, E=50.63), and possibly job-related deaths (SMR=214, 95% CI:153-292; O=40, E=18.65), as well as significant decreases in deaths for neoplasms (SMR=86, 95% CI:75-99; O=212, E=245.46); endocrine, nutritional, and metabolic diseases (SMR=52, 95% CI:27-91; O=12, E=23.07); respiratory diseases (SMR=68, 95% CI:45-99; O=27, E=39.62), and deaths for all cancer sites (SMR=87, 95% CI:75-99; O=210, E=242.15) (Table 41). Unionized employees with 15 to 29 years of employment displayed significant increases in deaths for lung cancer (SMR=128, 95% CI:103-156; O=97, E=76.08), and significant decreases in deaths for digestive diseases (SMR=56, 95% CI:34-86; O=20, E=35.75) and cirrhosis of the liver (SMR=47, 95% CI:22-90; O=9, E=18.97) (Table 42). Unionized employees with 30 or more years of employment displayed no significant results.

Employees whose decade of starting work was 1950-1959 displayed significant decreases in death for all causes (SMR=84, 95% CI:78-91; O=599, E=711.39); neoplasms (SMR=84, 95% CI:72-97; O=186, E=222.21); digestive diseases (SMR=62, 95% CI:38-95; O=20, E=32.50); deaths for all cancer sites (SMR=84, 95% CI:73-97; O=185, E=219.57); and prostate cancer (SMR=44, 95% CI:19-86; O=8, E=18.25) (Table 43).

Employees whose decade of starting work was 1960-1969 displayed significant increases in death for accidents, poisonings, and violence (SMR=138, 95% CI:114-166; O=113, E=82.03), and possibly job-related deaths (SMR=226, 95% CI:145-336; O=24, E=10.62)

(Table 44). Employees whose decade of starting work was 1970-1979 displayed significant increases in death for accidents, poisonings, and violence (SMR=152, 95% CI:121-188; O=85, E=56.02); road, rail, and air transport accidents (SMR=151, 95% CI:101.216; O=29, E=19.25); possibly job-related deaths (SMR=272, 95% CI:155-441; O=16, E=5.89); and displayed a significant decrease in death for neoplasms (SMR=75, 95% CI:56-99; O=50, E=66.59) (Table 45). Employees whose decade of starting work was 1928-1939, 1940-1949, 1980-1989, and 1990-1999 displayed no significant results.

Non-unionized underground mine employees with less than 15 years since first hire displayed a significant decrease in deaths for all causes (SMR=55, 95% CI:32-88; O=17, E=30.80) (Table 46). Those employees with 15 years or more since first hire displayed a significant decrease in deaths for all causes (SMR=68, 95% CI:54-83; O=88, E=130.01) (Table 47).

Non-unionized service employees with 15 years or more since first hire displayed significantly decreased deaths for all causes (SMR=70, 95% CI:51-93; O=46, E=66.05) and for circulatory diseases (SMR=60, 95% CI:35-96; O=17, E=28.37) (Table 48).

Those employees with less than 15 years since first hire displayed no significant results.

Non-unionized administration employees with less than 15 years since first hire displayed a significant decrease in deaths for all causes (SMR=72, 95% CI:50-99; O=36, E=50.14) (Table 49). Those employees with 15 years or more since first hire displayed significantly decreased deaths for all causes (SMR=61, 95% CI:50-73; O=109, E=178.91); neoplasms (SMR=65, 95% CI:45-89; O=36, E=55.75); circulatory disease

(SMR=74, 95% CI:55-96; O=54, E=73.36); deaths for all cancer sites (SMR=65, 95% CI:46-91; O=36, E=55); and lung cancer (SMR=40, 95% CI:16-82; O=7, E=17.58) (Table 50).

Non-unionized milling, smelter, office clerical, and production and maintenance employees with less than 15 years and 15 or more years since first hire both displayed no significant results.

Unionized underground mine employees with less than 15 years since first hire displayed a significant decrease in deaths for all cancer sites (SMR=61, 95% CI:35-99; O=16, E=26.31). Those employees also displayed significant increases in death for accidents, poisonings, and violence (SMR=168, 95% CI:136-206; O=94, E=55.80); road, rail, and air transport accidents (SMR=160, 95% CI:112-222; O=36, E=22.47); and possibly job-related deaths (SMR=389, 95% CI:251-574; O=25, E=6.43) (Table 51). Unionized underground mine employees with 15 or more years since first hire displayed a significant increase in deaths for accidents, poisonings, and violence (SMR=131, 95% CI:105-162; O=86, E=65.53), while those same employees displayed significantly decreased deaths for infective and parasitic diseases (SMR=48, 95% CI:19-98; O=7, E=14.70); endocrine, nutritional, and metabolic diseases (SMR=56, 95% CI:32-91; O=16, E=28.61); nervous system sense and organ diseases (SMR=31, 95% CI:11-67; O=6, E=19.64); and digestive diseases (SMR=69, 95% CI:47-98; O=32, E=46.24) (Table 52).

Unionized service employees with less than 15 years since first hire displayed a significant increase in deaths for possibly job-related deaths (SMR=43, 95% CI:104-478; O=8, E=3.30) (Table 53). Unionized service employees with 15 years or more since first hire displayed a significant increase in deaths for lung cancer (SMR=134, 95% CI:104-170; O=67, E=49.93) (Table 54).

Unionized smelter employees with 15 years or more since first hire displayed significant increases in death for both circulatory disease (SMR=116, 95% CI:101-133; O=219, E=188.41) and lung cancer (SMR=132, 95% CI:101-169; O=62, E=47.01) (Table 55). Those employees with less than 15 years since first hire displayed no significant results.

Unionized Xstrata Nickel sinter plant employees with 15 years or more since first hire displayed significant increases in deaths from all causes (SMR=132, 95% CI:105-163; O=84, E=63.86) and from circulatory diseases (SMR=146, 95% CI:104-200; O=39, E=26.72) (Table 56). Those employees with less than 15 years since first hire displayed no significant results.

Unionized office clerical employees with less than 15 years since first hire displayed a significant decrease in both all causes (SMR=54, 95% CI:36-78; O=28, E=51.72) and circulatory disease (SMR=37, 95% CI:14-81; O=6, E=16.20) (Table 57). Unionized office clerical employees with 15 years or more since first hire displayed significantly decreased deaths for all causes (SMR=61, 95% CI:51-72; O=140, E=229.82); neoplasms (SMR=72, 95% CI:53-94; O=51, E=71.23); circulatory diseases (SMR=60, 95% CI:45-

78; O=54, E=90.18); deaths for all cancer sites (SMR=73, 95% CI:54-95; O=51, E=70.28); and cancer of the lung (SMR=50, 95% CI:25-89; O=11, E=22.10) (Table 58).

Unionized production and maintenance employees with 15 years or more since first hire displayed a significant increase in deaths for circulatory disease (SMR=129, 95% CI:104-158; O=95, E=73.69) (Table 59). Those employees with less than 15 years since first hire displayed no significant results.

Unionized milling and administration employees with less than 15 years and 15 years or more since first hire all displayed no significant results.

Employees who worked in underground mines who had 0.5 to 14 years of employment displayed significant increases in death for accidents, poisonings, and violence (SMR=162, 95% CI:135-191; O=135, E=83.58); road, rail, and air transport accidents (SMR=180, 95% CI:134-237; O=50, E=27.77); and possibly job-related deaths (SMR=301, 95% CI:207-423; O=33, E=10.95), while displaying significantly decreased deaths for neoplasms (SMR=81, 95% CI:68-96; O=130, E=160.62); endocrine, nutritional, and metabolic diseases (SMR=40, 95% CI:15-87; O=6, E=15.01); and deaths all cancer sites (SMR=80, 95% CI:67-95; O=127, E=158.48) (Table 60). Employees who worked in underground mines who had 30 or more years of employment displayed significantly decreased deaths for all causes (SMR=85, 95% CI:71-100; O=142, E=168.03) (Table 61). Employees who worked in underground mines who had 15 to 29 years of employment displayed no significant results.

Employees who worked in milling who had 15 to 29 years of employment displayed significantly decreased deaths for all causes (SMR=70, 95% CI:51-94; O=43, E=61.40); neoplasms (SMR=46, 95% CI:20-91; O=8, E=17.25); and deaths for all cancer sites (SMR=47, 95% CI:20-93; O=8, E=17.02) (Table 62). Employees who worked in milling who had 0.5 to 14 years and 30 years or more of employment displayed no significant results.

Employees who worked in service who had 0.5 to 14 years of employment displayed significantly decreased deaths for digestive diseases (SMR=46, 95% CI:18-94; O=7, E=15.33) (Table 63). Employees who worked in service who had 15 to 29 and 30 or more years employment displayed no significant results.

Employees who worked in the smelter who had 0.5 to 14 years of employment displayed significantly increased deaths for boating and swimming (SMR=285, 95% CI:104-621; O=6, E=2.10) (Table 64). Employees who worked in the smelter who had 15 to 29 years employment displayed significantly increased deaths for circulatory disease conditions (SMR=136, 95% CI:106-173; O=68, E=49.94) (Table 65). Employees who worked in the smelter who had 30 or more years of employment displayed no significant results.

Employees who worked in administration who had 0.5 to 14 years of employment displayed significantly decreased deaths for all causes (SMR=64, 95% CI:53-78; O=102, E=158.29); neoplasms (SMR=62, 95% CI:42-88; O=30, E=48.42); and deaths for all

cancer sites (SMR=61, 95% CI:41-87; O=29, E=47.81) (Table 66). Employees who worked in administration who had 15 to 29 years of employment displayed significantly decreased deaths for all causes (SMR=70, 95% CI:49-97; O=35, E=50.19) (Table 67). Employees who worked in administration who had 30 or more years of employment displayed no significant results.

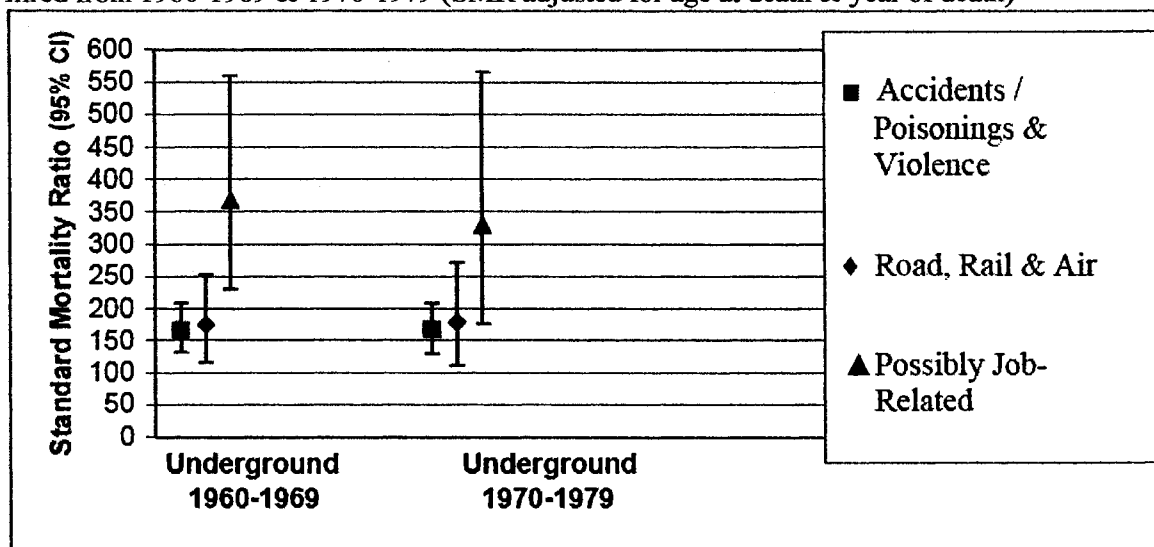
Employees who worked in office clerical areas who had 0.5 to 14 years of employment displayed significantly decreased deaths for all causes (SMR=64, 95% CI:53-77; O=119, E=185.70), and circulatory disease (SMR=56, 95% CI:39-77; O=38, E=68.17) (Table 68). Employees who worked in office clerical who had 15 to 29 years of employment displayed significantly decreased deaths for all causes (SMR=65, 95% CI:47-89; O=40, E=61.37) (Table 69). Employees who worked in office clerical who had 30 or more years of employment displayed no significant results.

Employees who worked in production and maintenance who had 0.5 to 14 years of employment displayed a significant increase in deaths for circulatory disease (SMR=133, 95% CI:107-164; O=90, E=67.61) (Table 70). Employees who worked in production and maintenance who had 0.5 to 14 years and 30 or more years of employment displayed no significant results.

Xstrata Nickel sinter plant employees displayed no significant results for any duration of employments examined.

Employees in the underground mines that commenced work in the 1940-1949 decade displayed significantly increased deaths for lung cancer (SMR=152, 95% CI:104-216; O=31, E=20.33) (Table 71). Employees in the underground mines that commenced work in the 1950-1959 decade displayed significantly decreased deaths for all causes (SMR=89, 95% CI:79-100; O=307, E=344.70) (Table 72). Employees in the underground mines that commenced work in the 1960-1969 decade displayed significantly increased deaths for accident, poisoning, and violence (SMR=166, 95% CI:131-208; O=76, E=45.83); road, rail, and air transport accidents (SMR=175, 95% CI:117-254; O=28, E=15.96); and possibly job-related deaths (SMR=369, 95% CI:231-559; O=22, E=5.96) (Table 73 and Figure 3). Employees in the underground mines that commenced work in the 1970-1979 decade displayed significantly increased deaths for accident, poisoning, and violence (SMR=168, 95% CI:129-216; O=62, E=36.80); road, rail, and air transport accidents (SMR=179, 95% CI:112-271; O=22, E=12.29); and possibly job-related deaths (SMR=330, 95% CI:176-565; O=13, E=3.94) (Table 74 and Figure 3). Employees in the underground mines that commenced work in the decades 1928-1939, 1980-1989 and 1990-1999 displayed no significant results.

Figure 3: Mortality by significant accident categories for underground (mine) employees first hired from 1960-1969 & 1970-1979 (SMR adjusted for age at death & year of death)



Employees who worked in the smelter that commenced work in the 1940-1949 decade displayed significantly increased deaths for all causes (SMR=126, 95% CI:102-153; O=97, E=77.15); circulatory disease (SMR=136, 95% CI:100-181; O=47, E=34.45); and lung cancer (SMR=184, 95% CI:101-309; O=14, E=7.60) (Table 75). Employees who worked in the smelter that commenced work in the 1960-1969 decade displayed significantly increased deaths for circulatory disease (SMR=140, 95% CI:103-186; O=47, E=33.59) (Table 76). Employees who worked in the smelter that commenced work in the 1928-1939, 1950-1959, 1970-1979, 1980-1989, and 1990-1999 decades displayed no significant results.

Xstrata Nickel sinter plant employees that commenced work in the 1940-1949 decade displayed significantly increased deaths for all causes (SMR=187, 95% CI:117-283; O=22, E=11.75) (Table 77). Xstrata Nickel sinter plant employees that commenced work in the 1960-1969 decade displayed significantly increased deaths for all causes (SMR=156, 95% CI:105-222; O=30, E=19.28); neoplasms (SMR=196, 95% CI:101-342;

O=12, E=6.13); and deaths for all cancer sites (SMR=198, 95% CI:102-346; O=12, E=6.06) (Table 78). Xstrata Nickel sinter plant employees that commenced work in the 1928-1939, 1950-1959, 1970-1979, and 1980-1989 decades displayed no significant results.

Production and maintenance employees that commenced work in the 1928-1929 decade displayed significantly decreased deaths for all causes (SMR=57, 95% CI:30-97; O=13, E=22.98) (Table 79). Production and maintenance employees that commenced work in the 1940-1949 decade displayed significantly increased deaths for lung cancer (SMR=400, 95% CI:160-824; O=7, E=1.75) (Table 80). Production and maintenance employees that commenced work in the 1950-1959 decade displayed significantly increased deaths for circulatory disease (SMR=142, 95% CI:101-194; O=39, E=27.52) (Table 81). Production and maintenance employees that commenced work in the 1970-1979 decade displayed significantly increased deaths for circulatory disease (SMR=190, 95% CI:133-263; O=36, E=18.94) (Table 82). Production and maintenance employees that commenced work in the 1960-1969, 1980-1989, and 1990-1999 decades displayed no significant results.

Administration employees displayed no significant results for any decade.

Appendix B contains all the tables with non-reportable data due to privacy and confidentiality restrictions.

Significant Cancer Incidence Table Groupings:

1. Overall cohort cancer incidence tables (15 yr categories, DOE, DFH & union status)	1-10
• Overall 15 year categories	1-2
• Union Status 15 year categories	3-4
• Union Status and Duration of Employment categories	5-6
• Start Decade	7-10
2. Statistical groups by 15 years since first hire categories & union status	11-20
3. Statistical groups by duration of employment categories & union status where indicated	21-28
4. Selected statistical groups by decade of first hire & union status where indicated	29-35

Significant Mortality Table Groupings:

5. Overall cohort mortality tables (15 yr categories, DOE, DFH & union status)	36-45
• Overall 15 year categories	36-37
• Union Status 15 year categories	38-40
• Union Status and Duration of Employment categories	41-42
• Start Decade	43-45
6. Statistical groups by 15 years since first hire categories & union status	46-59
7. Statistical groups by duration of employment categories & union status where indicated	60-70
8. Selected statistical groups by decade of first hire & union status where indicated	71-82

1. Overall cohort cancer incidence tables (15 yr categories, DOE, DFH & union status) Overall 15 year categories

Table 1: Overall cancer incidence with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	75	99.87	75	59-94	*
153-154,159.0	Cancer of the colon and rectum	10	10.51	95	46-175	
162	Cancer of the Lung	12	12.50	96	50-168	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 2: Overall cancer incidence with fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	1052	1219.67	86	81-92	**
140-145	Cancer of the lip & oral cavity	25	35.26	71	46-105	
146-149	Pharynx & Ill defined upper aero-digestive	8	17.73	45	19-89	*
150	Cancer of the esophagus	14	18.29	77	42-128	
151	Cancer of the stomach	33	39.23	84	58-118	
153-154,159.0	Cancer of the colon and rectum	167	172.71	97	83-113	
157	Cancer of the pancreas	30	30.11	100	67-142	
161	Cancer of the larynx	23	22.50	102	65-153	
162	Cancer of the Lung	256	233.53	110	97-124	
172	Malignant melanoma of the skin	17	37.56	45	26-72	**
185	Cancer of the prostate	185	252.30	73	63-85	**
186	Cancer of the testis	X	X	X	X	*
189.0-189.2	Cancer of the kidney	30	36.49	82	55-117	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	59	74.40	79	60-102	
191-192	Cancer of the brain & other nervous system	23	23.76	97	61-145	
193	Cancer of the thyroid	X	X	X	X	*
200,202	Non-Hodgkin's lymphoma	58	50.36	115	87-149	
203	Multiple Myeloma	18	16.84	107	63-169	
204-208	Leukemia	25	34.98	71	46-105	

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x = O<6 (excluded where not significant)

Union Status 15 year categories**Table 3: Cancer Incidence: Union with less than fifteen years since first hire**

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	70	91.76	76	59-96	*
153-154,159.0	Cancer of the colon and rectum	8	9.49	84	36-166	
162	Cancer of the Lung	11	11.15	99	49-176	
186	Cancer of the testis	9	7.47	121	55-229	

ICD-9 = International Classification of Diseases-Version 9

CI = Confidence Interval

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 E = Expected number of cases
 SIR = Standardized Mortality Ratio

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 x = O < 6 (excluded where not significant)

Table 4: Cancer Incidence: Union with fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	1016	1157.93	88	82-93	**
140-145	Cancer of the lip & oral cavity	25	33.63	74	48-110	
146-149	Pharynx & Ill defined upper aero-digestive	8	16.95	47	20-93	*
150	Cancer of the esophagus	14	17.38	81	44-135	
151	Cancer of the stomach	32	37.24	86	59-121	
153-154,159.0	Cancer of the colon and rectum	157	163.86	96	81-112	
157	Cancer of the pancreas	30	28.58	105	71-150	
161	Cancer of the larynx	23	21.42	107	68-161	
162	Cancer of the Lung	250	221.44	113	99-128	
172	Malignant melanoma of the skin	16	35.99	44	25-72	**
185	Cancer of the prostate	180	238.32	76	65-87	**
186	Cancer of the testis	X	X	X	X	*
189.0-189.2	Cancer of the kidney	28	34.80	80	53-116	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	57	70.47	81	61-105	
191-192	Cancer of the brain & other nervous system	22	22.74	97	61-146	
200,202	Non-Hodgkin's lymphoma	55	48.08	114	86-149	
203	Multiple Myeloma	16	15.96	100	57-163	
204-208	Leukemia	24	33.25	72	46-107	

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Union Status and Duration of Employment categories

Table 5: Cancer Incidence: Union with six months to fourteen years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	454	572.34	79	72-87	**
140-145	Cancer of the lip & oral cavity	15	18.57	81	45-133	
146-149	Pharynx & Ill defined upper aero-digestive	8	9.74	82	35-162	
150	Cancer of the esophagus	7	8.04	87	35-179	
151	Cancer of the stomach	15	17.46	86	48-142	
153-154,159.0	Cancer of the colon and rectum	58	76.30	76	58-98	*
157	Cancer of the pancreas	17	13.14	29	75-207	
161	Cancer of the larynx	9	10.45	86	39-164	
162	Cancer of the Lung	100	96.82	03	84-126	
172	Malignant melanoma of the skin	9	26.00	35	16-66	**
185	Cancer of the prostate	64	96.37	66	51-85	**
186	Cancer of the testis	9	11.80	76	35-145	
189.0-189.2	Cancer of the kidney	14	19.12	73	40-123	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	34	31.56	08	75-151	

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Table 6: Cancer Incidence: Union with fifteen to twenty-nine years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	441	468.61	94	86-103	
140-145	Cancer of the lip & oral cavity	9	13.75	65	30-124	
150	Cancer of the esophagus	6	7.09	85	31-184	
151	Cancer of the stomach	15	15.91	94	53-156	
153-154,159.0	Cancer of the colon and rectum	70	67.10	104	81-132	
157	Cancer of the pancreas	12	12.06	100	51-174	
161	Cancer of the larynx	7	8.92	78	31-162	
162	Cancer of the Lung	121	94.19	128	107-153	**
172	Malignant melanoma of the skin	7	12.37	57	23-117	
185	Cancer of the prostate	74	95.24	78	61-98	*
189.0-189.2	Cancer of the kidney	12	13.06	92	47-161	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	20	30.32	66	40-102	

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x = O < 6 (excluded where not significant)

Start Decade (first hire)**Table 7: Cancer Incidence: Start Decade of 1940 - 1949**

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	177	174.86	101	87-117	
140-145	Cancer of the lip & oral cavity	6	4.99	120	44-262	
153-154,159.0	Cancer of the colon and rectum	23	25.50	90	57-135	
157	Cancer of the pancreas	6	4.75	126	46-275	
162	Cancer of the Lung	53	36.81	144	108-188	*
185	Cancer of the prostate	31	36.73	84	57-120	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	7	12.27	57	23-118	
200,202	Non-Hodgkin's lymphoma	11	5.55	198	99-355	

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x = O < 6 (excluded where not significant)

Table 8: Cancer Incidence: Start Decade of 1950 - 1959

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	358	444.20	81	72-89	**
140-145	Cancer of the lip & oral cavity	7	12.40	56	23-116	
151	Cancer of the stomach	12	14.28	84	43-147	
153-154,159.0	Cancer of the colon and rectum	67	63.21	106	82-135	
157	Cancer of the pancreas	9	10.95	82	37-156	
161	Cancer of the larynx	9	8.54	105	48-200	
162	Cancer of the Lung	84	90.56	93	74-115	
172	Malignant melanoma of the skin	6	10.84	55	20-120	
185	Cancer of the prostate	67	96.53	69	54-88	**
189.0-189.2	Cancer of the kidney	9	11.92	75	34-143	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	22	28.50	77	48-117	
191-192	Cancer of the brain & other nervous system	8	7.90	101	44-200	
200,202	Non-Hodgkin's lymphoma	15	15.65	96	54-158	
204-208	Leukemia	X	X	X	X	*

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O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

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x = O < 6 (excluded where not significant)

Table 9: Cancer Incidence: Start Decade of 1960 - 1969

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	329	363.08	91	81-101	
140-145	Cancer of the lip & oral cavity	12	11.60	103	53-181	
150	Cancer of the esophagus	8	5.20	154	66-303	
151	Cancer of the stomach	11	10.69	103	51-184	
153-154,159.0	Cancer of the colon and rectum	40	48.78	82	59-112	
157	Cancer of the pancreas	12	8.25	145	75-254	
162	Cancer of the Lung	79	61.23	129	102-161	*
172	Malignant melanoma of the skin	8	16.69	48	21-94	*
185	Cancer of the prostate	52	64.15	81	61-106	
189.0-189.2	Cancer of the kidney	10	12.69	79	38-145	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	16	19.37	83	47-134	
191-192	Cancer of the brain & other nervous system	9	9.91	91	41-172	
201	Hodgkin's Disease	X	X	X	X	*
200,202	Non-Hodgkin's lymphoma	20	19.00	105	64-163	
204-208	Leukemia	9	11.49	78	36-149	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

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x = O < 6 (excluded where not significant)

Table 10: Cancer Incidence: Start Decade of 1970 - 1979

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	129	173.83	74	62-88	**
153-154,159.0	Cancer of the colon and rectum	22	22.21	99	62-150	
162	Cancer of the Lung	23	25.50	90	57-135	
172	Malignant melanoma of the skin	X	X	X	X	*
185	Cancer of the prostate	14	25.02	56	31-94	*
186	Cancer of the testis	6	5.37	112	41-243	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	12	8.47	142	73-247	
200,202	Non-Hodgkin's lymphoma	7	10.99	64	26-131	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

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x = O < 6 (excluded where not significant)

2. Statistical groups by 15 years since first hire categories & union status:**Table 11: Cancer Incidence: Non-Union; Job category 1: Underground Mines with less than fifteen years since first hire**

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	9	18.45	49	22-93	*

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$ ** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Table 12: Cancer Incidence: Non-Union; Job category 5: Administration with fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	82	111.94	73	58-91	**
153-154,159.0	Cancer of the colon and rectum	18	15.96	113	67-178	
162	Cancer of the Lung	13	21.45	61	32-104	
185	Cancer of the prostate	22	26.66	83	52-125	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	8	6.97	115	49-226	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$ ** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Table 13: Cancer Incidence: Union; Job category 1: Underground Mines with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	50	68.69	73	54-96	*
162	Cancer of the Lung	9	9.00	100	46-190	
186	Cancer of the testis	7	4.72	148	59-306	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 14: Cancer Incidence: Union; Job Category 1: Underground Mines with fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	584	657.72	89	82-96	**
140-145	Cancer of the lip & oral cavity	13	19.11	68	36-116	
151	Cancer of the stomach	21	21.10	100	62-152	
153-154,159.0	Cancer of the colon and rectum	98	93.06	105	85-128	
157	Cancer of the pancreas	15	16.22	92	52-153	
161	Cancer of the larynx	12	12.17	99	51-172	
162	Cancer of the Lung	153	125.63	122	103-143	*
172	Malignant melanoma of the skin	10	20.51	49	23-90	*
185	Cancer of the prostate	101	135.54	75	61-91	**
186	Cancer of the testis	X	X	X	X	*
189.0-189.2	Cancer of the kidney	16	19.88	80	46-131	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	26	39.83	65	43-96	*
191-192	Cancer of the brain & other nervous system	18	12.93	139	82-220	
193	Cancer of the thyroid	X	X	X	X	*
200,202	Non-Hodgkin's lymphoma	26	27.44	95	62-139	
203	Multiple Myeloma	11	9.07	121	60-217	
204-208	Leukemia	13	18.84	69	37-118	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 15: Cancer Incidence: Union; Job category 2: Milling with fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	148	180.54	82	69-96	*
151	Cancer of the stomach	X	X	X	X	*
153-154,159.0	Cancer of the colon and rectum	25	25.27	99	64-146	
161	Cancer of the larynx	6	3.27	183	67-399	
162	Cancer of the Lung	31	32.95	94	64-134	
172	Malignant melanoma of the skin	6	6.37	94	34-205	
174-175	Cancer of the breast	X	X	X	X	*
185	Cancer of the prostate	27	36.82	73	48-107	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	6	10.47	57	21-125	
200,202	Non-Hodgkin's lymphoma	10	8.16	123	59-225	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$ ** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Table 16: Cancer Incidence: Union; Job category 3: Service with fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	276	325.99	85	75-95	**
140-145	Cancer of the lip & oral cavity	8	9.11	88	38-173	
151	Cancer of the stomach	9	10.33	87	40-165	
153-154,159.0	Cancer of the colon and rectum	29	46.15	63	42-90	**
157	Cancer of the pancreas	13	7.95	164	87-280	
162	Cancer of the Lung	75	62.25	120	95-151	
172	Malignant melanoma of the skin	10	9.73	103	49-189	
174-175	Cancer of the breast	X	X	X	X	*
185	Cancer of the prostate	54	70.04	77	58-101	
189.0-189.2	Cancer of the kidney	9	9.57	94	43-179	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	10	19.89	50	24-92	*
200,202	Non-Hodgkin's lymphoma	13	13.18	99	52-169	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 17: Cancer Incidence: Union; Job category 4: Smelter with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	19	34.35	55	33-86	**

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 18: Cancer Incidence: Union; Job category 4: Smelter with fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	281	310.62	90	80-102	
150	Cancer of the esophagus	8	4.68	171	74-337	
153-154,159.0	Cancer of the colon and rectum	53	43.87	121	90-158	
157	Cancer of the pancreas	8	7.63	105	45-207	
161	Cancer of the larynx	6	5.83	103	38-224	
162	Cancer of the Lung	67	59.40	113	87-143	
172	Malignant melanoma of the skin	X	X	X	X	**
185	Cancer of the prostate	43	63.92	67	49-91	**
189.0-189.2	Cancer of the kidney	9	9.43	95	44-181	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	22	18.71	118	74-178	
200,202	Non-Hodgkin's lymphoma	15	12.95	116	65-191	
204-208	Leukemia	10	8.85	113	54-208	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O < 6 (excluded where not significant)

Table 19: Cancer Incidence: Union; Job category 7: Office Clerical with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	14	26.08	54	29-90	*

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = 0 < 6

Table 20: Cancer Incidence: Union; Job Category 8: Production and Maintenance with fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	77	98.89	78	61-97	*
153-154,159.0	Cancer of the colon and rectum	13	14.15	92	49-157	
162	Cancer of the Lung	27	19.07	142	93-206	
185	Cancer of the prostate	17	22.17	77	45-123	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	*

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = 0 < 6

3. Statistical groups by duration of employment categories & union status where indicated:

Table 21: Cancer Incidence: Job category 1: Underground Mines with six months to fourteen years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	289	369.67	78	26-71	**
140-145	Cancer of the lip & oral cavity	12	11.80	102	52-178	
151	Cancer of the stomach	8	11.30	71	30-139	
153-154,159.0	Cancer of the colon and rectum	39	49.70	78	56-107	
157	Cancer of the pancreas	9	8.55	105	48-200	
162	Cancer of the Lung	63	63.76	99	76-126	
172	Malignant melanoma of the skin	9	16.12	56	25-106	
185	Cancer of the prostate	40	64.42	62	44-85	**
186	Cancer of the testis	6	6.80	88	32-192	
189.0-189.2	Cancer of the kidney	12	12.21	98	51-172	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	17	20.64	82	48-132	
191-192	Cancer of the brain & other nervous system	10	10.00	100	48-184	
200,202	Non-Hodgkin's lymphoma	12	18.69	64	33-112	
204-208	Leukemia	8	11.73	68	29-134	

ICD-9 = International Classification of Diseases-Version 9

CI = Confidence Interval

O = Observed number of cases
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 SIR = Standardized Mortality Ratio

* indicates statistical significance at $p < 0.05$
 ** indicates statistical significance at $p < 0.01$
 x = O < 6 (excluded where not significant)

Table 22: Cancer Incidence: Job category 1: Underground Mines with fifteen to twenty-nine years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	255	251.70	101	89-115	
151	Cancer of the stomach	8	8.51	94	40-185	
153-154,159.0	Cancer of the colon and rectum	47	36.12	130	96-173	
157	Cancer of the pancreas	7	6.47	108	43-223	
162	Cancer of the Lung	69	50.77	136	106-172	*
172	Malignant melanoma of the skin	X	X	X	X	*
185	Cancer of the prostate	47	51.99	90		
189.0-189.2	Cancer of the kidney	6	6.98	86	31-187	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	11	16.23	68	34-121	
191-192	Cancer of the brain & other nervous system	10	4.56	219	105-403	*
200,202	Non-Hodgkin's lymphoma	9	9.32	97	44-183	

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 E = Expected number of cases
 SIR = Standardized Mortality Ratio

CI = Confidence Interval
 * indicates statistical significance at $p < 0.05$
 ** indicates statistical significance at $p < 0.01$
 x = O < 6 (excluded where not significant)

Table 23: Cancer Incidence: Job category 2: Milling with six months to fourteen years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	98	125.95	78	63-95	*
140-145	Cancer of the lip & oral cavity	6	3.95	152	55-330	
153-154,159.0	Cancer of the colon and rectum	16	16.98	94	54-153	
162	Cancer of the Lung	22	21.79	101	63-153	
185	Cancer of the prostate	13	22.41	58	31-99	*
189.0-189.2	Cancer of the kidney	X	X	X	X	*
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	6	7.00	86	31-187	
200,202	Non-Hodgkin's lymphoma	7	6.34	110	44-228	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 24: Cancer Incidence: Job category 2: Milling with fifteen to twenty-nine years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	18	32.98	55	32-86	**

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 25: Cancer Incidence: Job category 3: Service with six month fourteen years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	162	205.84	79	67-92	**
153-154,159.0	Cancer of the colon and rectum	23	28.37	81	51-122	
157	Cancer of the pancreas	9	4.96	181	83-344	
162	Cancer of the Lung	41	37.84	108	78-147	
172	Malignant melanoma of the skin	6	7.52	80	29-174	
185	Cancer of the prostate	27	38.36	70	46-102	
189.0-189.2	Cancer of the kidney	6	6.34	95	35-206	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	6	12.22	49	18-107	
191-192	Cancer of the brain & other nervous system	6	4.88	123	45-268	
200,202	Non-Hodgkin's lymphoma	6	9.28	65		

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SIR = Standardized Mortality Ratio

CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 26: Cancer Incidence: Job category 4: Smelter with six months to fourteen years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	151	196.96	77	65-90	**
140-145	Cancer of the lip & oral cavity	6	6.10	98	36-214	
153-154,159.0	Cancer of the colon and rectum	26	26.89	97	63-142	
162	Cancer of the Lung	34	35.35	96	67-134	
185	Cancer of the prostate	20	36.63	55	33-84	**
189.0-189.2	Cancer of the kidney	8	6.27	128	55-252	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	10	11.30	89	42-163	
200,202	Non-Hodgkin's lymphoma	9	9.25	97	44-185	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 27: Cancer Incidence: Job category 5: Administration with six months to fourteen years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	66	101.28	65	50-83	**
153-154,159.0	Cancer of the colon and rectum	9	14.21	63	29-120	
162	Cancer of the Lung	10	19.36	52	25-95	*
185	Cancer of the prostate	18	20.96	86	51-136	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 28: Cancer Incidence: Job category 7: Office Clerical with fifteen to twenty-nine years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	18	34.38	52	31-83	**

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

4. Selected statistical groups by decade of first hire & union status where indicated:

Table 29: Cancer Incidence: Job category 1: Underground Mines with Start Decade of 1940 - 1949

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	107	114.68	93	76-113	
153-154,159.0	Cancer of the colon and rectum	13	16.81	77	41-132	
162	Cancer of the Lung	42	24.26	173	125-234	**
185	Cancer of the prostate	14	23.97	58	32-98	*

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$

** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Table 30: Cancer Incidence: Job category 1: Underground Mines with Start Decade of 1950 - 1959

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	184	219.81	84	72-97	*
140-145	Cancer of the lip & oral cavity	X	X	X	X	*
151	Cancer of the stomach	8	7.04	114	49-224	
153-154,159.0	Cancer of the colon and rectum	37	31.26	118	83-163	
162	Cancer of the Lung	47	45.33	104	76-138	
185	Cancer of the prostate	31	47.88	65	44-92	*
189.0-189.2	Cancer of the kidney	6	5.86	102	37-223	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	9	14.10	64	29-121	
191-192	Cancer of the brain & other nervous system	6	3.88	155	56-336	
200,202	Non-Hodgkin's lymphoma	8	7.64	105	206	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$

** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Table 31: Cancer Incidence: Job category 1: Underground Mines with Start Decade of 1970 - 1979

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	93	125.55	74	60-91	**
153-154,159.0	Cancer of the colon and rectum	17	16.20	105	61-168	
162	Cancer of the Lung	17	18.86	90	52-144	
185	Cancer of the prostate	11	18.84	58	29-104	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	8	6.20	129	56-254	

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E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 32: Cancer Incidence: Job category 4: Smelter with Start Decade of 1950 - 1959

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	108	132.42	82	67-98	*
153-154,159.0	Cancer of the colon and rectum	27	18.77	144	95-209	
162	Cancer of the Lung	22	26.83	82	51-124	
185	Cancer of the prostate	19	28.61	66	40-104	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	9	8.36	108	49-204	

ICD-9 = International Classification of Diseases-Version 9

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E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 33: Cancer Incidence: Job category 4: Smelter with Start Decade of 1960 - 1969

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	58	74.67	78	59-100	
150	Cancer of the esophagus	X	X	X	X	*
153-154,159.0	Cancer of the colon and rectum	9	10.08	89	41-169	
162	Cancer of the Lung	14	12.60	111	61-186	
185	Cancer of the prostate	6	13.33	45	16-98	*

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 34: Cancer Incidence: Job category 8: Production and Maintenance with Start Decade of 1940 - 1949

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	12	10.08	119	61-208	
162	Cancer of the Lung	8	2.13	375	162-739	**

ICD-9 = International Classification of Diseases-Version 9

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E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 35: Cancer Incidence: Job category 8: Production and Maintenance with Start Decade of 1950 - 1959

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	20	33.62	59	69-92	*
162	Cancer of the Lung	6	6.96	86	31-188	

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O = Observed number of cases

E = Expected number of cases

SIR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

5. Overall cohort mortality tables (15 yr categories, DOE, DFH & union status):**Overall 15 year categories****Table 36: Overall cancer mortality with less than fifteen years since first hire**

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	240	232.89	103	90-117	
140-239	Neoplasms	32	38.97	82	56-116	
390-459	Circulatory disease	56	58.49	96	72-124	
520-579	Digestive disease	7	10.84	65	26-133	
800-999	Accidents/poisonings/violence	128	96.08	133	111-158	**
140-208	All cancer sites	30	38.35	78	53-112	
153,154,159.0	Cancer of the colon and rectum	6	4.24	142	52-308	
162	Cancer of the lung	8	8.56	93	40-184	
E800-848	Road, rail, air (transport except boating)	54	39.83	136	102-177	*
E830-838	Boating/ swimming	10	6.67	150	72-276	
E800-949	Possibly job related	27	11.20	241	159-351	**
E950-959	Suicide including possible suicide	30	27.53	109	73-156	

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SMR = Standardized Mortality Ratio

CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 37: Overall cancer mortality with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	1744	1906.41	91	87-96	**
001-139	Infective and parasitic diseases	12	26.50	45	23-79	**
140-239	Neoplasms	545	586.06	93	85-101	
240-279	Endocrine/nutritional/metabolic disease	31	53.62	58	39-82	**
290-319	Mental Disorders	19	26.94	71	42-110	
320-389	Nervous system/sense organ disease	17	37.20	46	27-73	**
390-459	Circulatory disease	761	770.81	99	92-106	
460-519	Respiratory disease	106	128.65	82	67-100	*
520-579	Digestive disease	57	86.18	66	50-86	**
580-629	Genitourinary disease	20	22.94	87	53-135	
780-799	Symptoms/ill-defined	19	31.63	60	36-94	*
800-999	Accidents/poisonings/violence	150	122.05	123	104-144	*
140-208	All cancer sites	542	578.74	94	86-102	
150	Cancer of the esophagus	13	18.77	69	37-118	
151	Cancer of the stomach	18	25.50	71	42-112	
153,154,159.0	Cancer of the colon and rectum	77	75.54	102	80-127	
157	Cancer of the pancreas	24	28.75	83	53-124	
161	Cancer of the larynx	7	8.16	86	34-177	
162	Cancer of the lung	203	186.10	109	95-125	
170	Cancer of the bone	X	X	X	X	*
172	Malignant melanoma of the skin	6	8.92	67	25-146	
185	Cancer of the prostate	31	45.63	68	46-96	*
189.0-189.2	Cancer of the kidney	14	14.55	96	53-162	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	12	15.65	77	40-134	
191-192	Cancer of the brain and other nervous system	21	17.52	120	74-183	
200, 202	Non-Hodgkin's lymphoma	25	21.21	118	76-174	
203	Multiple myeloma	12	9.56	126	65-219	
204-208	Leukemia	15	19.83	76	42-125	
571	Cirrhosis of the liver	30	47.27	63	43-91	**
E800-848	Road, rail, air (transport except boating)	36	29.28	123	86-170	
E830-838	Boating/ swimming	7	5.29	132	53-273	

E800-949	Possibly job related	29	21.67	134	90-192
E950-959	Suicide including possible suicide	49	41.81	117	87-155
E970-978	Assault	7	3.80	184	74-380
E980-989	Other accidents	22	20.21	109	68-165

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* indicates statistical significance at $p < 0.05$ ** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Union Status 15 year categories

Table 38: Mortality: Union with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	231	217.47	106	93-121	
140-239	Neoplasms	29	35.57	82	55-117	
390-459	Circulatory disease	54	53.29	101	76-132	
520-579	Digestive disease	7	9.97	70	28-145	
800-999	Accidents/poisonings/violence	126	92.23	137	114-163	**
140-208	All cancer sites	28	35.00	80	53-116	
162	Cancer of the lung	7	7.61	92	37-190	
E800-848	Road, rail, air (transport except boating)	53	38.51	138	103-180	*
E830-838	Boating/ swimming	10	6.43	156	74-286	
E800-949	Possibly job related	27	10.69	253	166-368	**
E950-959	Suicide including possible suicide	29	26.28	110	74-158	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$ ** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Table 39: Mortality: Union with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	1686	1806.19	93	89-98	**
001-139	Infective and parasitic diseases	12	25.48	47	24-82	**
140-239	Neoplasms	526	555.01	95	87-103	
240-279	Endocrine/nutritional/metabolic disease	29	50.72	57	38-82	**
290-319	Mental Disorders	18	25.59	70	42-111	
320-389	Nervous system/sense organ disease	15	35.12	43	24-70	**
390-459	Circulatory disease	736	728.77	101	94-109	
460-519	Respiratory disease	103	121.11	85	69-103	
520-579	Digestive disease	55	82.00	67	51-87	**
580-629	Genitourinary disease	20	21.63	92	56-143	
780-799	Symptoms/ill-defined	19	30.21	63	38-98	*
800-999	Accidents/poisonings/violence	146	117.44	124	105-146	*
140-208	All cancer sites	523	548.09	95	87-104	
150	Cancer of the esophagus	13	17.81	73	39-125	
151	Cancer of the stomach	18	24.16	74	44-118	
153,154,159.0	Cancer of the colon and rectum	71	71.49	99	78-125	
157	Cancer of the pancreas	24	27.24	88	56-131	

161	Cancer of the larynx	7	7.75	90	36-186	
162	Cancer of the lung	200	176.21	114	98-130	
170	Cancer of the bone	X	X	X	X	*
185	Cancer of the prostate	31	42.79	72	49-103	
189.0-189.2	Cancer of the kidney	13	13.81	94	50-161	
188, 189.3 -189.4, 189.8 - 189.9	Cancer of the bladder and other urinary	12	14.75	81	42-142	
191-192	Cancer of the brain and other nervous system	20	16.75	119	73-184	
200, 202	Non-Hodgkin's lymphoma	23	20.14	114	72-171	
203	Multiple myeloma	10	9.03	111	53-204	
204-208	Leukemia	15	18.80	80	45-132	
571	Cirrhosis of the liver	29	45.16	64	43-92	*
E800-848	Road, rail, air (transport except boating)	34	28.24	120	83-168	
E830-838	Boating/ swimming	7	5.11	137	55-282	
E800-949	Possibly job related	27	20.72	130	86-190	
E950-959	Suicide including possible suicide	49	40.36	121	90-161	
E970-978	Assault	7	3.67	190	76-393	
E980-989	Other accidents	22	19.34	114	71-172	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 40: Mortality: Non-Union with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	281	383.78	73	65-82	**
140-239	Neoplasms	97	117.93	82	67-100	
240-279	Endocrine/nutritional/metabolic disease	7	11.11	63	25-130	
390-459	Circulatory disease	127	161.58	79	66-94	**
460-519	Respiratory disease	19	30.17	63	38-98	*
520-579	Digestive disease	9	15.73	57	26-109	
800-999	Accidents/poisonings/violence	11	16.53	67	33-119	
140-208	All cancer sites	97	116.42	83	68-102	
153,154,159.0	Cancer of the colon and rectum	14	15.44	91	50-152	
162	Cancer of the lung	34	37.45	91	63-127	
185	Cancer of the prostate	9	11.18	81	37-153	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Union Status and Duration of Employment categories

Table 41: Mortality: Union with six months to fourteen years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	804	858.99	94	87-100	
001-139	Infective and parasitic diseases	10	17.13	58	28-107	
140-239	Neoplasms	212	245.46	86	75-99	*
240-279	Endocrine/nutritional/metabolic disease	12	23.07	52	27-91	*
290-319	Mental Disorders	11	12.20	90	45-161	
320-389	Nervous system/sense organ disease	10	16.09	62	30-114	
390-459	Circulatory disease	270	284.71	95	84-107	
460-519	Respiratory disease	27	39.62	68	45-99	*
520-579	Digestive disease	30	41.92	72	48-102	
780-799	Symptoms/ill-defined	12	17.31	69	36-121	
800-999	Accidents/poisonings/violence	200	145.94	137	119-157	**
140-208	All cancer sites	210	242.15	87	75-99	*
150	Cancer of the esophagus	7	8.07	87	35-179	
151	Cancer of the stomach	9	10.41	86	39-164	
153,154,159.0	Cancer of the colon and rectum	29	30.25	96	64-138	
157	Cancer of the pancreas	13	11.87	110	58-187	
162	Cancer of the lung	75	73.39	102	80-128	
185	Cancer of the prostate	8	12.48	64	28-126	
189.0-189.2	Cancer of the kidney	6	6.54	92	34-200	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	6	5.16	116	42-253	
191-192	Cancer of the brain and other nervous system	7	10.72	65	26-135	
200, 202	Non-Hodgkin's lymphoma	10	10.51	95	46-175	
204-208	Leukemia	7	10.23	68	27-141	
571	Cirrhosis of the liver	19	26.05	73	44-114	
E800-848	Road, rail, air (transport except boating)	70	50.63	138	108-175	*
E830-838	Boating/ swimming	12	8.64	139	72-243	
E800-949	Possibly job related	40	18.65	214	153-292	**
E950-959	Suicide including possible suicide	55	47.39	116	87-151	
E970-978	Assault	9	5.27	171	78-324	
E980-989	Other accidents	14	15.37	91	50-153	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$

** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Table 42: Mortality: Union with fifteen to twenty-nine years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	784	806.17	97	91-104	
001-139	Infective and parasitic diseases	X	X	X	X	*
140-239	Neoplasms	251	237.69	106	93-120	
240-279	Endocrine/nutritional/metabolic disease	13	21.33	61	32-104	
290-319	Mental Disorders	8	11.27	71	31-140	
320-389	Nervous system/sense organ disease	X	X	X	X	**
390-459	Circulatory disease	359	343.62	104	94-116	

460-519	Respiratory disease	56	58.44	96	72-124	
520-579	Digestive disease	20	35.75	56	34-86	**
580-629	Genitourinary disease	10	10.14	99	47-181	
780-799	Symptoms/ill-defined	6	11.07	54	20-118	
800-999	Accidents/poisonings/violence	53	47.31	112	84-147	
140-208	All cancer sites	249	234.83	106	93-120	
151	Cancer of the stomach	8	10.82	74	32-146	
153,154,159.0	Cancer of the colon and rectum	33	30.95	107	73-150	
157	Cancer of the pancreas	11	11.69	94	47-168	
162	Cancer of the lung	97	76.08	128	103-156	*
170	Cancer of the bone	X	X	X	X	*
185	Cancer of the prostate	16	20.31	79	45-128	
191-192	Cancer of the brain and other nervous system	12	6.59	182	94-318	
200, 202	Non-Hodgkin's lymphoma	9	8.04	112	51-213	
203	Multiple myeloma	8	3.88	206	89-406	
571	Cirrhosis of the liver	9	18.97	47	22-90	*
E800-848	Road, rail, air (transport except boating)	13	11.61	112	60-192	
E800-949	Possibly job related	11	9.28	119	59-212	
E950-959	Suicide including possible suicide	16	14.95	107	61-174	
E980-989	Other accidents	8	7.97	100	43-198	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$ ** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Start Decade (first hire)**Table 43: Mortality: Start Decade of 1950 - 1959**

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	599	711.39	84	78-91	**
140-239	Neoplasms	186	222.21	84	72-97	*
240-279	Endocrine/nutritional/metabolic disease	11	19.45	57	28-101	
290-319	Mental Disorders	7	9.45	74	30-153	
320-389	Nervous system/sense organ disease	X	X	X	X	**
390-459	Circulatory disease	277	293.67	94	84-106	
460-519	Respiratory disease	40	48.51	82	59-112	
520-579	Digestive disease	20	32.50	62	38-95	*
780-799	Symptoms/ill-defined	X	X	X	X	**
800-999	Accidents/poisonings/violence	44	43.36	101	74-136	
140-208	All cancer sites	185	219.57	84	73-97	*
151	Cancer of the stomach	8	9.52	84	36-166	
153,154,159.0	Cancer of the colon and rectum	32	28.55	112	77-158	
157	Cancer of the pancreas	9	10.71	84	38-160	
162	Cancer of the lung	73	73.20	100	78-125	
185	Cancer of the prostate	8	18.25	44	19-86	*
191-192	Cancer of the brain and other nervous system	7	6.08	115	46-237	
200, 202	Non-Hodgkin's lymphoma	7	7.53	93	37-191	
204-208	Leukemia	6	7.33	82	30-178	
571	Cirrhosis of the liver	10	17.99	56	27-102	
E800-848	Road, rail, air (transport except boating)	14	11.70	120	65-201	
E800-949	Possibly job related	9	8.59	105	48-199	
E950-959	Suicide including possible suicide	11	12.99	85	42-152	

ICD-9 = International Classification of Diseases-Version 9
 O = Observed number of cases
 E = Expected number of cases
 SMR = Standardized Mortality Ratio

CI = Confidence Interval
 * indicates statistical significance at $p < 0.05$
 ** indicates statistical significance at $p < 0.01$
 x = O < 6 (excluded where not significant)

Table 44: Mortality: Start Decade of 1960 - 1969

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	525	489.97	107	98-117	
001-139	Infective and parasitic diseases	6	9.60	63	23-136	
140-239	Neoplasms	162	150.33	108	92-126	
240-279	Endocrine/nutritional/metabolic disease	10	13.91	72	34-132	
290-319	Mental Disorders	9	6.97	129	59-245	
320-389	Nervous system/sense organ disease	6	8.89	68	25-147	
390-459	Circulatory disease	167	154.41	108	92-126	
460-519	Respiratory disease	14	19.60	71	39-120	
520-579	Digestive disease	21	25.21	83	52-127	
780-799	Symptoms/ill-defined	9	10.51	86	39-163	
800-999	Accidents/poisonings/violence	113	82.03	138	114-166	**
140-208	All cancer sites	160	148.33	108	92-126	
153,154,159.0	Cancer of the colon and rectum	21	18.42	114	71-174	
157	Cancer of the pancreas	10	7.38	135	65-249	
162	Cancer of the lung	58	45.61	127	97-164	
185	Cancer of the prostate	8	6.17	130	56-255	
191-192	Cancer of the brain and other nervous system	9	6.67	135	62-256	
200, 202	Non-Hodgkin's lymphoma	7	6.66	105	42-217	
571	Cirrhosis of the liver	14	16.42	85	47-143	
E800-848	Road, rail, air (transport except boating)	39	28.88	135	96-185	
E830-838	Boating/ swimming	6	4.94	122	44-265	
E800-949	Possibly job related	24	10.62	226	145-336	**
E950-959	Suicide including possible suicide	35	26.36	133	92-185	
E970-978	Assault	7	2.93	239	96-492	
E980-989	Other accidents	X	X	X	X	*

ICD-9 = International Classification of Diseases-Version 9
 O = Observed number of cases
 E = Expected number of cases
 SMR = Standardized Mortality Ratio

CI = Confidence Interval
 * indicates statistical significance at $p < 0.05$
 ** indicates statistical significance at $p < 0.01$
 x = O < 6 (excluded where not significant)

Table 45: Mortality: Start Decade of 1970 - 1979

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	231	240.45	96	84-109	
001-139	Infective and parasitic diseases	X	X	X	X	*
140-239	Neoplasms	50	66.59	75	56-99	*
390-459	Circulatory disease	65	64.09	101	78-129	
460-519	Respiratory disease	7	7.68	91	37-188	
520-579	Digestive disease	X	X	X	X	*
800-999	Accidents/poisonings/violence	85	56.02	152	121-188	**
140-208	All cancer sites	50	65.58	76	57-101	
153,154,159.0	Cancer of the colon and rectum	7	7.94	88	35-182	
162	Cancer of the lung	17	18.45	92	54-148	
E800-848	Road, rail, air (transport except boating)	29	19.25	151	101-216	*
E800-949	Possibly job related	16	5.89	272	155-441	**
E950-959	Suicide including possible suicide	23	19.57	118	74-176	

E980-989	Other accidents	11	5.97	184	92-330
ICD-9 = International Classification of Diseases-Version 9		CI = Confidence Interval			
O = Observed number of cases		* indicates statistical significance at p<0.05			
E = Expected number of cases		** indicates statistical significance at p<0.01			
SMR = Standardized Mortality Ratio		x = O<6 (excluded where not significant)			

6. Statistical groups by 15 years since first hire categories & union status

Table 46: Mort: Non-Union; Job category 1: Underground Mines with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	17	30.80	55	32-88	*
390-459	Circulatory disease	9	11.80	76	35-145	
ICD-9 = International Classification of Diseases-Version 9		CI = Confidence Interval				
O = Observed number of cases		* indicates statistical significance at p<0.05				
E = Expected number of cases		** indicates statistical significance at p<0.01				
SMR = Standardized Mortality Ratio		x = O<6 (excluded where not significant)				

Table 47: Mort: Non-Union; Job category 1: Underground Mines with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	88	130.01	68	54-83	**
140-239	Neoplasms	30	40.10	75	50	
390-459	Circulatory disease	42	54.49	77	56-104	
460-519	Respiratory disease	6	10.34	58	21-126	
140-208	All cancer sites	30	39.58	76	51-108	
162	Cancer of the lung	13	12.73	102	54-175	
ICD-9 = International Classification of Diseases-Version 9		CI = Confidence Interval				
O = Observed number of cases		* indicates statistical significance at p<0.05				
E = Expected number of cases		** indicates statistical significance at p<0.01				
SMR = Standardized Mortality Ratio		x = O<6 (excluded where not significant)				

Table 48: Mortality: Non-Union; Job category 3: Service with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	46	66.05	70	51-93	*
140-239	Neoplasms	13	19.86	65	35-112	
390-459	Circulatory disease	17	28.37	60	35-96	*
460-519	Respiratory disease	7	5.56	126	50-259	
140-208	All cancer sites	13	19.60	66	35-113	
162	Cancer of the lung	7	6.26	112	45-230	
ICD-9 = International Classification of Diseases-Version 9		CI = Confidence Interval				
O = Observed number of cases		* indicates statistical significance at p<0.05				
E = Expected number of cases		** indicates statistical significance at p<0.01				
SMR = Standardized Mortality Ratio		x = O<6 (excluded where not significant)				

Table 49: Mortality: Non-Union; Job category 5: Administration with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	36	50.14	72	50-99	*
140-239	Neoplasms	11	13.26	83	41-148	
390-459	Circulatory disease	14	19.44	72	39-121	
800-999	Accidents/poisonings/violence	9	7.92	114	52-216	
140-208	All cancer sites	10	13.13	76	36-140	

ICD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 50: Mortality: Non-Union; Job category 5: Administration with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	109	178.91	61	50-73	**
140-239	Neoplasms	36	55.75	65	45-89	**
390-459	Circulatory disease	54	73.36	74	55-96	*
460-519	Respiratory disease	X	X	X	X	**
140-208	All cancer sites	36	55.00	65	46-91	**
153,154,159.0	Cancer of the colon and rectum	9	7.25	124	57-236	
162	Cancer of the lung	7	17.58	40	16-82	**

ICD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 51: Mortality: Union; Job category 1: Underground Mines with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	165	144.14	114	98-133	
140-239	Neoplasms	17	26.72	64	37-102	
390-459	Circulatory disease	42	36.15	116	84-157	
800-999	Accidents/poisonings/violence	94	55.80	168	136-206	**
140-208	All cancer sites	16	26.31	61	35-99	*
E800-848	Road, rail, air (transport except boating)	36	22.47	160	112-222	*
E800-949	Possibly job related	25	6.43	389	251-574	**
E950-959	Suicide including possible suicide	20	16.54	121	74-187	
E980-989	Other accidents	6	4.52	133	49-289	

ICD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 52: Mortality: Union; Job category 1: Underground Mines with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	964	1014.96	95	89-101	

001-139	Infective and parasitic diseases	7	14.70	48	19-98	*
140-239	Neoplasms	295	313.92	94	84-105	
240-279	Endocrine/nutritional/metabolic disease	16	28.61	56	32-91	*
290-319	Mental Disorders	10	14.24	70	34-129	
320-389	Nervous system/sense organ disease	6	19.64	31	11-67	**
390-459	Circulatory disease	427	408.38	105	95-115	
460-519	Respiratory disease	55	67.19	82	62-107	
520-579	Digestive disease	32	46.24	69	47-98	*
580-629	Genitourinary disease	10	12.03	83	40-153	
780-799	Symptoms/ill-defined	14	17.13	82	45-137	
800-999	Accidents/poisonings/violence	86	65.53	131	105-162	*
140-208	All cancer sites	292	310.00	94	84-106	
150	Cancer of the esophagus	6	10.14	59	22-129	
151	Cancer of the stomach	13	13.64	95	51-163	
153,154,159.0	Cancer of the colon and rectum	38	40.39	94	67-129	
157	Cancer of the pancreas	13	15.44	84	45-144	
162	Cancer of the lung	117	99.82	117	97-140	
170	Cancer of the bone	X	X	X	X	*
185	Cancer of the prostate	17	23.88	71	41-114	
189.0-189.2	Cancer of the kidney	8	7.84	102	44-201	
191-192	Cancer of the brain and other nervous system	14	9.53	147	80-246	
200, 202	Non-Hodgkin's lymphoma	13	11.44	114	60-194	
203	Multiple myeloma	8	5.11	157	67-309	
204-208	Leukemia	6	10.59	57	21-123	
571	Cirrhosis of the liver	17	25.60	66	39-106	
E800-848	Road, rail, air (transport except boating)	20	15.65	128	78-197	
E800-949	Possibly job related	19	11.52	165	99-258	
E950-959	Suicide including possible suicide	25	22.70	110	71-163	
E980-989	Other accidents	14	10.79	130	71-218	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 53: Mortality: Union; Job category 3: Service with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	85	96.96	88	70-108	
140-239	Neoplasms	18	20.85	86	51-136	
390-459	Circulatory disease	38	32.05	119	84-163	
800-999	Accidents/poisonings/violence	24	26.89	89	57-133	
140-208	All cancer sites	18	20.61	87	52-138	
E800-848	Road, rail, air (transport except boating)	9	10.50	86	39-163	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	8	3.30	43	104-478	*

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 54: Mortality: Union; Job category 3: Service with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
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	All causes	491	507.55	97	88-106	
140-239	Neoplasms	158	157.22	100	85-117	
240-279	Endocrine/nutritional/metabolic disease	11	14.52	76	38-136	
390-459	Circulatory disease	210	204.74	103	89-117	
460-519	Respiratory disease	36	35.31	102	71-141	
520-579	Digestive disease	15	22.49	67	37-110	
580-629	Genitourinary disease	7	6.27	112	45-230	
780-799	Symptoms/ill-defined	7	8.42	83	33-171	
800-999	Accidents/poisonings/violence	34	30.62	111	77-155	
140-208	All cancer sites	158	155.23	102	87-119	
153,154,159.0	Cancer of the colon and rectum	19	20.30	94	56-146	
157	Cancer of the pancreas	11	7.64	144	72-258	
162	Cancer of the lung	67	49.93	134	104-170	*
185	Cancer of the prostate	7	12.78	55	22-113	
200, 202	Non-Hodgkin's lymphoma	6	5.65	106	39-231	
571	Cirrhosis of the liver	7	12.08	58	23-119	
E800-848	Road, rail, air (transport except boating)	10	7.23	138	66-254	
E950-959	Suicide including possible suicide	13	10.39	125	67-214	

ICD-9 = International Classification of Diseases-Version 9
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SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 55: Mortality: Union; Job category 4: Smelter with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	485	471.85	103	94-112	
140-239	Neoplasms	149	147.05	101	86-119	
240-279	Endocrine/nutritional/metabolic disease	11	13.27	83	41-148	
290-319	Mental Disorders	7	6.57	106	43-219	
390-459	Circulatory disease	219	188.41	116	101-133	*
460-519	Respiratory disease	28	30.29	92	61-134	
520-579	Digestive disease	16	21.90	73	42-119	
780-799	Symptoms/ill-defined	X	X	X	X	*
800-999	Accidents/poisonings/violence	38	31.83	119	84-164	
140-208	All cancer sites	148	145.24	102	86-120	
150	Cancer of the esophagus	6	4.78	125	46-273	
151	Cancer of the stomach	X	X	X	X	*
153,154,159.0	Cancer of the colon and rectum	24	18.87	127	81-189	
162	Cancer of the lung	62	47.01	132	101-169	*
170	Cancer of the bone	X	X	X	X	**
204-208	Leukemia	7	4.96	141	57-291	
571	Cirrhosis of the liver	11	12.38	89	44-159	
E800-848	Road, rail, air (transport except boating)	8	7.73	103	45-204	
E830-838	Boating/ swimming	X	X	X	X	*
E800-949	Possibly job related	6	5.53	108	40-236	
E950-959	Suicide including possible suicide	14	11.04	127	69-213	

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CI = Confidence Interval
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** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 56: Mort: Union; Job category 6: Xstrata Sinter Plant with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	84	63.86	132	105-163	*
140-239	Neoplasms	26	20.16	129	84-189	
390-459	Circulatory disease	39	26.72	146	104-200	*
460-519	Respiratory disease	8	4.45	180	77-354	
140-208	All cancer sites	26	19.92	131	85-191	
162	Cancer of the lung	7	6.58	106	43-219	

ICD-9 = International Classification of Diseases-Version 9
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E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 57: Mortality: Union; Job category 7: Office Clerical with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	28	51.72	54	36-78	**
140-239	Neoplasms	6	11.10	54	20-118	
390-459	Circulatory disease	6	16.20	37	14-81	**
800-999	Accidents/poisonings/violence	12	15.14	79	41-138	
140-208	All cancer sites	6	10.97	55	20-119	
140-145	Cancer of the lip and oral cavity	X	X	X	X	*
E950-959	Suicide including possible suicide	6	4.58	131	48-285	

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SMR = Standardized Mortality Ratio

CI = Confidence Interval
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** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 58: Mortality: Union; Job category 7: Office Clerical with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	140	229.82	61	51-72	**
140-239	Neoplasms	51	71.23	72	53-94	*
390-459	Circulatory disease	54	90.18	60	45-78	**
460-519	Respiratory disease	X	X	X	X	**
520-579	Digestive disease	6	10.25	59	21-127	
800-999	Accidents/poisonings/violence	12	14.58	82	42-144	
140-208	All cancer sites	51	70.28	73	54-95	*
162	Cancer of the lung	11	22.10	50	25-89	*
185	Cancer of the prostate	7	5.74	122	49-251	
E800-848	Road, rail, air (transport except boating)	6	3.35	179	65-390	

ICD-9 = International Classification of Diseases-Version 9
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E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
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** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 59: Mortality: Union; Job category 8: Production and maintenance with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	176	173.16	102	87-118	
140-239	Neoplasms	45	50.48	89	65-119	

390-459	Circulatory disease	95	73.69	129	104-158	*
460-519	Respiratory disease	9	14.13	64	29-121	
520-579	Digestive disease	10	7.08	141	68-260	
800-999	Accidents/poisonings/violence	7	8.49	82	33-170	
140-208	All cancer sites	45	49.83	90	66-121	
162	Cancer of the lung	23	15.70	147	93-220	
571	Cirrhosis of the liver	6	3.35	179	65-390	

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E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
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** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

7. Statistical groups by duration of employment categories & union status where indicated

Table 60: Mortality: Job category 1: Underground Mines with six months to fourteen years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	532	550.10	97	89-105	
140-239	Neoplasms	130	160.62	81	68-96	*
240-279	Endocrine/nutritional/metabolic disease	6	15.01	40	15-87	*
290-319	Mental Disorders	6	7.85	76	28-166	
320-389	Nervous system/sense organ disease	X	X	X	X	*
390-459	Circulatory disease	191	187.56	102	88-117	
460-519	Respiratory disease	20	26.62	75	46-116	
520-579	Digestive disease	19	26.84	71	43-111	
780-799	Symptoms/ill-defined	9	10.97	82	37-156	
800-999	Accidents/poisonings/violence	135	83.58	162	135-191	**
140-208	All cancer sites	127	158.48	80	67-95	*
153,154,159.0	Cancer of the colon and rectum	18	19.90	90	54-143	
157	Cancer of the pancreas	8	7.78	103	44-203	
162	Cancer of the lung	46	48.66	95	69-126	
191-192	Cancer of the brain and other nervous system	7	6.69	105	42-215	
571	Cirrhosis of the liver	9	16.54	54	25-103	
E800-848	Road, rail, air (transport except boating)	50	27.77	180	134-237	**
E830-838	Boating/ swimming	6	4.79	125	46-272	
E800-949	Possibly job related	33	10.95	301	207-423	**
E950-959	Suicide including possible suicide	31	27.73	112	76-159	
E980-989	Other accidents	10	9.30	108	51-198	

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E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6 (excluded where not significant)

Table 61: Mortality: Job category 1: Underground Mines with thirty or more years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	142	168.03	85	71-100	*
140-239	Neoplasms	43	49.88	86	62-116	
390-459	Circulatory disease	70	74.06	95	74-119	
460-519	Respiratory disease	11	14.33	77	38-137	

800-999	Accidents/poisonings/violence	6	5.75	104	38-227	
140-208	All cancer sites	43	49.26	87	63-118	
162	Cancer of the lung	20	15.93	126	77-194	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	*

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SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 62: Mortality: Job category 2: Milling with fifteen to twenty-nine years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	43	61.40	70	51-94	*
140-239	Neoplasms	8	17.25	46	20-91	*
390-459	Circulatory disease	25	26.68	94	61-138	
140-208	All cancer sites	8	17.02	47	20-93	*

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SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 63: Mortality: Job category 3: Service with six months to fourteen years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	322	327.51	98	88-110	
140-239	Neoplasms	91	95.41	95	77-117	
240-279	Endocrine/nutritional/metabolic disease	8	8.74	91	39-180	
390-459	Circulatory disease	145	123.82	117	99-138	
460-519	Respiratory disease	16	19.43	82	47-134	
520-579	Digestive disease	7	15.33	46	18-94	*
800-999	Accidents/poisonings/violence	37	37.10	100	70-137	
140-208	All cancer sites	91	94.20	97	78-119	
153,154,159.0	Cancer of the colon and rectum	17	12.09	141	82-225	
157	Cancer of the pancreas	7	4.64	151	60-311	
162	Cancer of the lung	38	29.61	128	91-176	
571	Cirrhosis of the liver	6	8.88	68	25-147	
E800-848	Road, rail, air (transport except boating)	11	11.74	94	47-168	
E800-949	Possibly job related	7	5.41	129	52-267	
E950-959	Suicide including possible suicide	13	12.06	108	57-184	

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E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
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** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 64: Mortality: Job category 4: Smelter with six months to fourteen years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	288	295.27	98	87-109	
140-239	Neoplasms	80	88.19	91	72-113	
240-279	Endocrine/nutritional/metabolic disease	7	8.09	87	35-178	
390-459	Circulatory disease	118	106.22	111	92-133	

460-519	Respiratory disease	13	15.67	83	44-142	
520-579	Digestive disease	13	14.20	92	49-157	
800-999	Accidents/poisonings/violence	44	37.38	118	86-158	
140-208	All cancer sites	79	87.06	91	72-113	
153,154,159.0	Cancer of the colon and rectum	11	11.05	100	50-178	
162	Cancer of the lung	30	27.34	110	74-157	
170	Cancer of the bone	X	X	X	X	*
571	Cirrhosis of the liver	10	8.55	117	56-215	
E800-848	Road, rail, air (transport except boating)	11	12.02	91	46-164	
E830-838	Boating/ swimming	6	2.10	285	104-621	*
E800-949	Possibly job related	7	5.21	134	54-277	
E950-959	Suicide including possible suicide	15	12.33	122	68-201	

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E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 65: Mortality: Job category 4: Smelter with fifteen to twenty-nine years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	125	116.20	108	90-128	
140-239	Neoplasms	35	35.02	100	70-139	
390-459	Circulatory disease	68	49.94	136	106-173	*
460-519	Respiratory disease	8	7.98	100	43-197	
140-208	All cancer sites	35	34.62	101	70-141	
153,154,159.0	Cancer of the colon and rectum	8	4.55	176	76-347	
162	Cancer of the lung	14	11.43	123	67-206	

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E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 66: Mortality: Job category 5: Administration with six months to fourteen years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	102	158.29	64	53-78	**
140-239	Neoplasms	30	48.42	62	42-88	**
390-459	Circulatory disease	47	62.45	75	55-100	
460-519	Respiratory disease	X	X	X	X	*
800-999	Accidents/poisonings/violence	11	12.34	89	44-160	
140-208	All cancer sites	29	47.81	61	41-87	**
162	Cancer of the lung	9	15.39	58	27-111	

ICD-9 = International Classification of Diseases-Version 9
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E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
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** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 67: Mortality: Job category 5: Administration with fifteen to twenty-nine years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	35	50.19	70	49-97	*
140-239	Neoplasms	12	15.30	78	40-137	
390-459	Circulatory disease	18	21.65	83	49-131	
140-208	All cancer sites	12	15.11	79	41-139	

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 E = Expected number of cases
 SMR = Standardized Mortality Ratio

CI = Confidence Interval
 * indicates statistical significance at $p < 0.05$
 ** indicates statistical significance at $p < 0.01$
 x = O < 6 (excluded where not significant)

Table 68: Mortality: Job category 7: Office Clerical with six months to fourteen years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	119	185.70	64	53-77	**
140-239	Neoplasms	44	54.69	80	58-108	
390-459	Circulatory disease	38	68.17	56	39-77	**
460-519	Respiratory disease	X	X	X	X	**
520-579	Digestive disease	8	8.65	92	40-182	
800-999	Accidents/poisonings/violence	17	21.98	77	45-124	
140-208	All cancer sites	44	53.97	82	59-109	
162	Cancer of the lung	9	16.79	54	24-102	
E800-848	Road, rail, air (transport except boating)	6	6.98	86	31-187	
E950-959	Suicide including possible suicide	7	7.24	97	39-199	

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 E = Expected number of cases
 SMR = Standardized Mortality Ratio

CI = Confidence Interval
 * indicates statistical significance at $p < 0.05$
 ** indicates statistical significance at $p < 0.01$
 x = O < 6 (excluded where not significant)

Table 69: Mortality: Job category 7: Office Clerical with fifteen to twenty-nine years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	40	61.37	65	47-89	**
140-239	Neoplasms	12	17.58	68	35-119	
390-459	Circulatory disease	20	26.17	76	47-118	
140-208	All cancer sites	12	17.35	69	36-121	

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 E = Expected number of cases
 SMR = Standardized Mortality Ratio

CI = Confidence Interval
 * indicates statistical significance at $p < 0.05$
 ** indicates statistical significance at $p < 0.01$
 x = O < 6 (excluded where not significant)

Table 70: Mortality: Job category 8: Production and Maintenance with six months to fourteen years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	161	160.39	100	85-117	
140-239	Neoplasms	43	46.72	92	67-124	
390-459	Circulatory disease	90	67.61	133	107-164	*
520-579	Digestive disease	6	6.94	86	32-188	
800-999	Accidents/poisonings/violence	9	10.91	82	38-157	
140-208	All cancer sites	43	46.16	93	67-125	
162	Cancer of the lung	21	14.82	142	88-217	

ICD-9 = International Classification of Diseases-Version 9
 O = Observed number of cases
 E = Expected number of cases
 SMR = Standardized Mortality Ratio

CI = Confidence Interval
 * indicates statistical significance at $p < 0.05$
 ** indicates statistical significance at $p < 0.01$
 x = O < 6 (excluded where not significant)

8. Selected statistical groups by decade of first hire & union status where indicated

Table 71: Mortality: Job category 1: Underground Mines with Start Decade of 1940 - 1949

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	242	236.37	102	90-116	
140-239	Neoplasms	69	64.43	107	83-136	
320-389	Nervous system/sense organ disease	X	X	X	X	*
390-459	Circulatory disease	128	108.91	118	98-140	
460-519	Respiratory disease	15	20.31	74	41-122	
520-579	Digestive disease	7	9.38	75	30-154	
800-999	Accidents/poisonings/violence	11	10.18	108	54-193	
140-208	All cancer sites	68	63.66	107	83-135	
153,154,159.0	Cancer of the colon and rectum	9	8.62	104	48-198	
162	Cancer of the lung	31	20.33	152	104-216	*
170	Cancer of the bone	X	X	X	X	*

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$

** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Table 72: Mortality: Job category 1: Underground Mines with Start Decade of 1950 - 1959

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	307	344.70	89	79-100	*
140-239	Neoplasms	96	109.61	88	71-107	
240-279	Endocrine/nutritional/metabolic disease	10	9.40	106	51-196	
390-459	Circulatory disease	142	141.99	100	84-118	
460-519	Respiratory disease	19	22.78	83	50-130	
520-579	Digestive disease	10	15.96	63	30-115	
800-999	Accidents/poisonings/violence	20	20.56	97	59-150	
140-208	All cancer sites	95	108.34	88	71-107	
153,154,159.0	Cancer of the colon and rectum	11	14.03	78	39-140	
162	Cancer of the lung	41	36.61	112	80-152	
185	Cancer of the prostate	6	8.76	68	25-149	
571	Cirrhosis of the liver	7	8.99	78	31-160	
E800-949	Possibly job related	6	4.10	46	53-319	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$

** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Table 73: Mortality: Job category 1: Underground Mines with Start Decade of 1960 - 1969

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	299	274.84	109	97-122	
140-239	Neoplasms	91	85.73	106	85-130	

290-319	Mental Disorders	6	3.85	156	57-340	
390-459	Circulatory disease	91	85.93	106	85-130	
460-519	Respiratory disease	6	10.39	58	21-126	
520-579	Digestive disease	12	14.36	84	43-146	
800-999	Accidents/poisonings/violence	76	45.83	166	131-208	**
140-208	All cancer sites	89	84.60	105	84-129	
153,154,159.0	Cancer of the colon and rectum	12	10.49	114	59-200	
157	Cancer of the pancreas	7	4.22	166	66-342	
162	Cancer of the lung	31	26.15	119	81-168	
191-192	Cancer of the brain and other nervous system	6	3.82	157	57-342	
571	Cirrhosis of the liver	9	9.48	95	43-180	
E800-848	Road, rail, air (transport except boating)	28	15.96	175	117-254	**
E800-949	Possibly job related	22	5.96	369	231-559	**
E950-959	Suicide including possible suicide	18	14.89	121	72-191	
E980-989	Other accidents	X	X	X	X	*

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$ ** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Table 74: Mortality: Job category 1: Underground Mines with Start Decade of 1970 - 1979

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	168	170.60	98	84-115	
140-239	Neoplasms	37	48.63	76	54-105	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	*
390-459	Circulatory disease	49	46.98	104	77-138	
800-999	Accidents/poisonings/violence	62	36.80	168	129-216	**
140-208	All cancer sites	37	47.91	77	54-106	
153,154,159.0	Cancer of the colon and rectum	7	5.84	120	48-247	
162	Cancer of the lung	12	13.73	87	45-153	
571	Cirrhosis of the liver	X	X	X	X	*
E800-848	Road, rail, air (transport except boating)	22	12.29	179	112-271	*
E800-949	Possibly job related	13	3.94	330	176-565	**
E950-959	Suicide including possible suicide	16	13.06	122	70-199	
E980-989	Other accidents	7	4.02	174	70-358	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$ ** indicates statistical significance at $p < 0.01$

x = O < 6 (excluded where not significant)

Table 75: Mortality: Job category 4: Smelter with Start Decade of 1940 - 1949

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	97	77.15	126	102-153	*
140-239	Neoplasms	29	22.90	127	85-182	
390-459	Circulatory disease	47	34.45	136	100-181	*
460-519	Respiratory disease	8	5.46	146	63-289	
800-999	Accidents/poisonings/violence	7	4.03	174	70-358	
140-208	All cancer sites	29	22.65	128	86-184	
162	Cancer of the lung	14	7.60	184	101-309	*
E830-838	Boating/ swimming	X	X	X	X	*

ICD-9 = International Classification of Diseases-Version 9

CI = Confidence Interval

O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

* indicates statistical significance at $p < 0.05$
** indicates statistical significance at $p < 0.01$
x = O < 6 (excluded where not significant)

Table 76: Mortality: Job category 4: Smelter with Start Decade of 1960 - 1969

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	109	103.56	105	86-127	
140-239	Neoplasms	29	31.25	93	62-133	
390-459	Circulatory disease	47	33.59	140	103-186	*
520-579	Digestive disease	6	5.28	114	42-247	
800-999	Accidents/poisonings/violence	12	16.47	73	38-127	
140-208	All cancer sites	29	30.83	94	63-135	
153,154,159.0	Cancer of the colon and rectum	6	3.86	156	57-339	
162	Cancer of the lung	11	9.39	117	58-210	

ICD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at $p < 0.05$
** indicates statistical significance at $p < 0.01$
x = O < 6 (excluded where not significant)

Table 77: Mortality: Job category 6: Xstrata Sinter Plant with Start Decade of 1940 - 1949

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	22	11.75	187	117-283	**
390-459	Circulatory disease	11	5.78	190	95-340	
460-519	Respiratory disease	X	X	X	X	*
171	Cancer of the connective tissue	X	X	X	X	*

ICD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at $p < 0.05$
** indicates statistical significance at $p < 0.01$
x = O < 6 (excluded where not significant)

Table 78: Mortality: Job category 6: Xstrata Sinter Plant with Start Decade of 1960 - 1969

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	30	19.28	156	105-222	*
140-239	Neoplasms	12	6.13	196	101-342	*
390-459	Circulatory disease	12	7.48	161	83-280	
140-208	All cancer sites	12	6.06	198	102-346	*
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	*
204-208	Leukemia	X	X	X	X	*

ICD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at $p < 0.05$
** indicates statistical significance at $p < 0.01$
x = O < 6 (excluded where not significant)

Table 79: Mortality: Job category 8: Production and Maintenance with Start Decade of 1920 - 1929

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	13	22.98	57	30-97	*

390-459	Circulatory disease	7	11.41	61	25-126	
161	Cancer of the larynx	X	X	X	X	**

ICD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 80: Mortality Job category 8: Production and Maintenance with Start Decade of 1940 - 1949

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	27	20.89	129	85-188	
140-239	Neoplasms	10	5.54	181	86-332	
390-459	Circulatory disease	12	9.69	124	64-216	
140-208	All cancer sites	10	5.48	183	87-336	
162	Cancer of the lung	7	1.75	400	160-824	**
571	Cirrhosis of the liver	X	X	X	X	*

ICD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 81: Mortality: Job category 8: Production and Maintenance with Start Decade of 1950 - 1959

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	64	61.90	103	80-132	
140-239	Neoplasms	10	17.76	56	27-104	
390-459	Circulatory disease	39	27.52	142	101-194	*
140-208	All cancer sites	10	17.56	57	27-105	

ICD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Table 82: Mortality: Job category 8: Production and Maintenance with Start Decade of 1970 - 1979

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	60	54.76	110	84-141	
140-239	Neoplasms	14	16.89	83	45-139	
390-459	Circulatory disease	36	18.94	190	133-263	**
140-208	All cancer sites	14	16.68	84	46-141	
162	Cancer of the lung	9	5.29	170	78-323	

ICD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6 (excluded where not significant)

Discussion

Examination of cancer incidence and mortality data for this cohort reflected very few significantly high SIRs and SMRs, especially for SIRs. In both cases the majority of significant results were found to be significantly low.

Results for cancer incidence and mortality based on less than 15 years since first hire and greater than 15 years since first hire at Xstrata Nickel yielded no significantly increased SIRs or SMRs for any cancer sites considered. In fact, cancer incidence for both only yielded significantly low results. This is also true for cancer mortality, with only a one significantly low result being reported. It must also be emphasized that during these time periods workers may have been employed elsewhere for any length of time. Data collected for this study were taken from company payroll records, which were not designed for use in epidemiological studies. In addition, it was common practice for new unionized employees to be assigned to the sinter plant, during its period of operation (i.e., 1932-1978). Furthermore, confounding factors and occupational exposure assessments were not considered in this study.

In the present study deaths resulting from accidents, poisoning, or violence were significantly elevated for both workers with less than 15 years since first hire and for workers with 15 or more years since first hire (SIR=133, CI:111-158; O=128, E=96.08 and SIR=123, CI:104-144; O=150, E=122.05, respectively). Workers with less than 15 years since first hire also displayed significantly high SMRs for rail, road, or air accidents (transport except boating) and possibly job-related accidents (SMR=136, CI:102-177;

O=54, E=39.83 and SMR=241, CI:159-351; O=27, E=11.20, respectively) deaths. It is also important to note that this analysis does not indicate the exact location of these deaths and possibly job-related refers to all types of employment anywhere, not just work at Xstrata Nickel, as well as the possibility that some may not be job-related.

The Sudbury District Health Unit also provides statistics for the period of 1993-1997 and injuries and poisonings are the fourth leading cause of death in Ontario for both men and women. While this holds true for women in the Sudbury region, it was found that injuries and poisonings for men in the Sudbury region was the third leading cause of death, higher than the provincial average. (71) In addition, cancer incidence and mortality results for this descriptive epidemiology study reflected very few significantly high SIRs and SMRs and in both cases the majority of significant results were found to be significantly low. The Sudbury District Health Unit lists cancer as the second leading cause of death in the province.

Previous studies have shown that life in northeastern Ontario and northern communities is associated with increased risk of violent death from recreational activities and transportation accidents (46, 47, 48). Since surveillance studies of this type are not suitable for detailed study of accidental and other violent deaths, the data, as presently constructed, do not permit extensive analysis, but more detailed future case studies could be valuable.

In a cross sectional 1986 study, Bota and Cox examined motor vehicle accidents in northeastern Ontario (46). Specifically, they examined the inevitability of motor vehicle accident deaths and whether they would have been preventable. The incidence rate of death associated with death in the Sudbury Ontario area was 0.3 per 1000 (1971-1977), which was significantly higher when compared to the provincial rate of 0.21 per 1000 (46).

In another cross sectional study from 1995, Rowe et al. stated that trauma is the leading cause of death in children and adults under the age of 45, and is the third most common cause of death behind cardiovascular disease and cancer (47). Rowe et al. further state that in areas such as northeastern Ontario, trauma is an even greater health risk, particularly due to adverse environmental conditions that promote trauma and the limited access to health services to treat these traumas (47). The study which was based on reports from the calendar years 1989 to 1991 reported that 69% of all trauma cases were “nonintentional trauma” that included 522 males and 186 females. Specifically, the lead cause of trauma in Northeastern Ontario was found to be motor vehicle collisions, which accounts for 34.1% of all deaths. When combined with non-traffic motor vehicle trauma the percentage increased to 39.2%. This yielded a crude rate of 23.4 deaths per 100,000 per year. The overall Ontario average was 13.9 deaths per 100,000 per year (at the time of report, 1989/1990) (47).

In 1992, Rowe et al. also undertook another cross sectional study that examined snowmobile related deaths in Ontario. During the 5 year review that covered 1985-1986

to 1989-1990 131 deaths were observed. Of these 131 deaths the largest portion occurred in northeastern Ontario (48).

Biases and Limitations

It is most unfortunate that workplace occupational exposure data (e.g., soluble and insoluble nickel, metal dusts, sulphur dioxide, polycyclic aromatic hydrocarbons, oil mists, etc.) were not obtained in this study. This limits the ability to make recommendations for future studies and potential workplace interventions and can make publication of the study results in the peer-reviewed literature more challenging.

It is unfortunate that we have no information about the influence of potential confounders (e.g, smoking data to interpret the lung cancer results) on the results. A simple example of a confounding variable is described by Baumgarten et al. as follows:

Confounding occurs when a variable is associated with both the exposure and the disease that we are studying. The presence of associations between the confounder and the exposure, and between the confounder and the disease, makes it seem as though the exposure is the cause of the disease, but really the exposure is only guilty by association. When the effect of an exposure is mixed with the effect of another variable (the confounding variable), we may incorrectly conclude that the disease is caused by the exposure. We might then attempt to eliminate the exposure in the hope that the disease could be prevented. If, however, the association between the exposure and the disease is

due to confounding and is not causal, elimination of the exposure will not have any effect on the incidence of the disease.” (68)

Another potential bias that must be considered is the healthy worker effect. According to the Dictionary of Public Health, the healthy worker effect is defined as “The effect of prior selection, observed in the early stages of studies of workers in industries exposed to occupational hazards. Because unhealthy people are more likely to be rejected and healthy people are more likely to be recruited, the sickness and death rates initially may be lower in the exposed workforce than in the general population “(67). Wen et. al. described the healthy worker effect in their 1983 article “Anatomy of the healthy worker effect: a critical review” as follows:

“The healthy worker effect is the composite result from factors such as (1) selection of the work force, (2) changes in lifestyle accompanying employment, and (3) methodological characteristics of the standardized mortality ratio (SMR). While the choice of the general population as the comparison population is the underlying reason for this effect, no more feasible, widely accepted or "better" alternative is yet available. Much of the current understanding of the healthy worker effect has been limited to an examination of selection of the work force.” (69). Wen et. al. go on to explain the importance of many factors other than selection, including employment-associated benefits such as economic gain, medical insurance and lifestyle changes, the proportion of active workers, the calculation method, data completeness, length of follow-up and certain characteristics of SMR methodology. (69) As such, the strength of the healthy worker effect depends on the proportion of active workers in the cohort. Also, the

disappearance of the healthy worker effect may be due to factors such as aging of the cohort and can be totally unrelated to the true increase in the mortality risk. (69)

Another factor that requires discussion is underestimation of disease outcomes attributable to out of province migration. As the Ontario Cancer Registry was used in this study, any employees that moved out of Ontario and then developed cancer or passed away would not be accounted for in this study. In their study of cancer incidence Julian and Muir (1996) stated that “*out of province migration leads to an under-estimation for groups with less than 15 years exposure (45).*” This leads to the possibility of an ascertainment bias, however the level of out of province migration is unknown but not expected to be excessive, a statement with which we also concur (45).

The length of the study must also be taken into consideration. Shannon et al. (31, 32, 33) previously studied the Falconbridge cohort. However, these studies utilized a different follow-up period for their data because they did not use the Cancer Care Ontario database for their linkage; instead they used a Statistics Canada national linkage at much higher cost. As a result their cohorts included members that were alive on January 1st, 1950, as opposed to January 1st, 1964 for this study. Therefore direct comparisons between these two studies are not possible because the differences in the follow-up periods differ by many years. However, the study results for those with fifteen or more years since first hire display results and trends comparable and consistent with what Shannon found previously, overall, for lung cancer and for accidents, poisoning, and violence in this cohort.

It must also be noted that there could be misclassification using payroll information to for coding to statistical analysis groups. The coding of department and occupation to statistical groups was done by a person in administration selected by the company and union, versus an occupational hygienist, such that the person could have less knowledge and experience in coding jobs with similar exposures to the same statistical group.

It is very important to consider the possibility of biased results being due to chance in the study, as a result to the use of systematic multiple comparison testing. An example of multiple comparisons is described in a 2003 article by Gotchfeld et. al. in which he stated:

“If one is studying the effect of soy milk formulas on infant development comparing soy- to cow-based or breast-fed babies, a series of endpoints might be considered including height attainment, weight for height, bone ossification, cognitive development, and gonadal and genital development. If for example, only the latter were statistically significant at the 0.05 level, one might interpret this as evidence for a phytoestrogen effect. But skeptics would disagree and indicate that when you have six endpoints that are being tested, that increases the chance that any one of them might emerge as “significant” by chance alone, therefore you have to correct for multiple comparisons.”

(70)

Another possible study limitation is that for employees who develop a health outcome, the health outcome is coded to all statistical groups in which the employee worked so in some cases this could lead to misclassification.

It is also important to consider the quality of the data linkage in occupational cohort studies. In this study similar to many others, the most difficult links to resolve were links that differed on birthdate. While it is difficult to quantify something that is based on judgement and experience, the basic approach is summarized as follows:

If the names were in agreement and the birthdates did not entirely agree and there were no other fields available for consideration:

Outcome	Birth Year	Month	Day	Comments
Match	Within 5	=	=	Also consider uniqueness of names
Match	Disagree on 1 digit of yy	=	=	1932 vs. 1942 or 1922 vs. 1928
Match	=	Dd	mm	Month and day transposed
Match	=	=	Not =	Also consider uniqueness of names

Otherwise, if the birthdates were too far off, or the names were very common or the reviewer was uncertain, the records were considered to be non-matches.

Recommendations and Related Studies

Future studies would take less time to conduct if duplication of employee records and prohibition of the reuse of employee identification numbers occurred.

As previously stated, workers with less than 15 years since first hire displayed significantly high SMRs for the possibly job-related category. In Ontario, rates of injury are high among those 15 to 24 years of age and for those 65 years or older (53) Of the

reportable data 11 significantly high SMRs were reported, 6 of those were for underground mine (4) and service (2) workers. Both underground mine and service workers could have been exposed to a variety of potential hazards on their job. These could include such factors as those related to machinery, tools, chemicals, and more as well as physical exertion, impact on the body, noise, etc. Unfortunately, along with not knowing whether the incident took place on the job at Xstrata Nickel, the exact nature of these possibly-job related mortalities was also not determined in the study (e.g. for a fall, how it occurred, under what conditions, etc). Utilizing further ICD categories to include combinations of types of accidents would be recommended in the future.

A case-control study by Paul et. al. from 2005 examined various factors in coal-mine related injuries. The cohort was comprised of mine workers (n = 150) who had sustained a prior mine-related injury from a population of 1000 underground workers (64). Controls were selected from those mineworkers with no history of a prior mine-related injury using frequency matching (n = 150) from the same source population (64). The results, based on a structured survey questionnaire, found that the multivariate odds of injuries to high risk taking, negatively affected and job dissatisfied workers were 1.21, 9.34 and 2.00 times more, respectively, when compared to their lowest counterparts (64). Furthermore, the results indicated that workers satisfied with the overall safety practice and safety equipment availability and maintenance are 1.5 and 3.12 times less likely to be injured than the workers with little or no satisfaction with the above factors (64).

Another case-control study of coal-mine workers by Ghosh et. al. (2004) assessed the relationship of age, poor perception of working condition, poor safety environment, poor management and supervision, risk-taking behavior, emotional instability, negative job involvement, job dissatisfaction, job stress, and poor safety performance of workers to occupational injuries (65). For all workers combined, the factors with significant adjusted odds ratios (ORs) found were: 30-45 and >45 yr age groups (OR vs. <30 yr age group: OR 1.80, 95% CI:102-317 and OR 2.59, 95% CI:138-485, respectively), poor perception of working conditions (OR 1.61, 95% CI:100-318), emotional instability (OR 2.33, 95% CI:104-522), job stress (OR 1.83, 95% CI:100-346) and poor safety performance of workers (OR 3.10, 95% CI:145-663) (65). The study concluded that older age, poor perception of work conditions, poor work environment, and human behavioral factors played significant roles in occupational injuries (65).

The current study provides evidence of the need for a closer examination of accidental mortality data by work area, in particular for workers employed in the underground mine and service divisions. An initial improvement would be to develop a revised database where specific ICD subcategories could be included for further analysis. This would provide the ability to search for more specific patterns of factors that are not readily apparent in aggregate data sets or in single accident reports. Furthermore, a more detailed analysis could provide insights about working conditions that may contribute to mortality, resulting in more consistency with current approaches to understanding fatalities and other major accidents in terms of safety management systems.

Follow-up studies could include case studies focused on accidents, poisonings, or violence and possibly job-related mortality. Also, with management and union approval, it could help make these results available to local health units, support groups, and educational institutions. In relation to cancer, it would be helpful to combine the CVRD Inco and Xstrata Nickel cohorts to study risk factors for lung cancer and/or colorectal cancer.

This study did not include investigation of mesothelioma and this is recommended in future as studies have shown that any potential asbestos exposure to employees is found in 70 to 80 percent of all mesothelioma cases (66). Lung cancer includes tumours of the trachea, bronchus and lung (but not pleura) and incidence has been declining among men since the mid 1980s in Ontario (51). It is estimated that 90% of lung cancers in men and 70% in women are directly attributable to cigarette smoking (52). Studies have shown approximately a 10-fold increase for men and 5-fold increase for women in lung cancer when cigarette smoking is involved (50). When combined with exposure to other risk factors such as asbestos, the risk increases dramatically to 50-fold (50). There is also evidence to suggest that environmental tobacco smoke (i.e., second-hand smoke) and dietary factors (i.e., low carotene intake) increase one's lung cancer risk (50). There are also several substances associated with lung cancer occupationally including: indoor radon (extrapolated from underground mining studies), polycyclic hydrocarbons (e.g. steel, coal), arsenic, nickel compounds and chromium compounds (50 52). There is also little supporting evidence for an associated increase in lung cancer risk associated with

air pollution (52). Note however the lack of associated exposure information related to risk.

Since more people die from lung cancer than any other type of cancer, for both men and women, many studies have been done examining a wide range of risk factors for lung cancer (54). Tobacco smoke exposure is the strongest aetiological factor associated with lung cancer (56). In a 2007 case control study by Chari et. al., serial analysis of gene expression (SAGE) was used to examine the effect of active smoking by comparing the transcriptomes of clinical specimens obtained from current, former and never smokers. The study found that while expression levels of some of the genes related to tobacco smoking return to levels similar to never smokers upon cessation of smoking, the expression of others appears to be permanently altered despite prolonged smoking cessation, and it is these irreversible changes that may account for the persistent lung cancer risk despite smoking cessation (56). While the mechanisms by which tobacco promotes lung cancer remain incompletely understood, a 2007 experiment study by Zheng et. al. produced observations that suggest that nicotine stimulates non small cell lung carcinoma (NSCLC) proliferation through induction of fibronectin, and that these events are mediated through nAChR-mediated signals that include ERK and PI3-K/mTOR pathways (57). According to Subramanian and Govindan, although tobacco smoking accounts for the majority of lung cancer, approximately 10% of patients with lung cancer in the United States are lifelong never smokers (55).

Many other risk factors aside from smoking have been identified for lung cancer. One of the major risk factors considered is air pollution. In a 2007 case control study by Ramanakumar et. al., the risk for lung cancer when exposed to residential heating and cooking fuels was examined using 739 male cases, 925 male controls, 466 female cases, and 616 female controls (58). The resulting odds ratios (adjusted for covariates such as smoking) revealed that while among men there was no indication of excess risk, the odds ratio for women exposed to both traditional heating and cooking sources was 2.5 (95% CI: 1.5-3.6; n = 253) (58). An ecological study from Texas in 2006 by Coyle et. al. examined the association of metal air pollutants with lung cancer. The results from the study found that there are positive associations between zinc with the primary ($p = 0.02$) and non-small cell ($p < 0.01$) lung cancer rates as well as chromium and copper with the non-small cell lung cancer rate ($p = 0.01$ and $p = 0.01$, respectively) (59). Another study performed a retrospective examination of a cohort of U.S. truckers. Their results showed that lung cancer rates were elevated among all drivers (SMR = 1.10; 95% CI: 1.02-1.19) and dockworkers (SMR = 1.10; 95% CI: 0.94-1.30). These results indicate that exposure to fine particulate air pollution, and specifically particulate matter from vehicle exhausts, can lead to an excess of mortality due to lung cancer (60).

A large case-control study from Bardin-Mikolajczak et. al. (2007) examined the relationship between the risk of lung cancer and occupation and industry. The study, which spanned six countries in Europe, included 2,056 male and 576 female lung cancer incidence cases diagnosed from 1998 to 2001 and 2,144 male and 727 female controls frequency-matched for sex and age (61). With potential confounders being taken into

account and controlled for, elevated odds ratios (OR) were observed in many cases. Elevated odds ratios (ORs) were found for men employed as production workers (OR 1.45, 95% CI:122-172), bookkeepers and cashiers (OR 1.81, 95% CI:103-324), general farmers (OR 1.67, 95% CI:108-260), livestock workers (OR 2.54, 95% CI:109-588), miners (OR 2.17, 95% CI:147-323), toolmakers and metal patternmakers (OR 2.56, 95% CI:134-494), glass formers (OR 2.55, 95% CI:118-550), dockworkers, and freight handlers (OR 1.49, 95% CI:104-212) (61). Industries with elevated risk among men included mining (OR 1.75, 95% CI:120-257), manufacture of cement, lime, or plaster (OR 3.62, 95% CI:111-1200), casting of metals (OR 2.00, 95% CI:117-345), manufacture of electric motors (OR 2.18, 95% CI:124-386) (61). For women, elevated ORs were found for medical, dental, veterinary doctors (OR 2.54, 95% CI:101-631), librarians and curators (OR 7.03, 95% CI:180-278), sewers (OR 3.63 95% CI:112-1023) (61).

Two other recent studies have examined potential lung cancer risk factors that are less well known. The first study used a retrospective cohort by Kirk et. al. (2007) examined the association between HIV infection and increased risk for lung cancer. The study found that lung cancer mortality increased during the highly active antiretroviral therapy era, compared with the pre-highly active antiretroviral therapy period (SMR 4.7; 95% CI:17-160) (62). After adjusting for age, sex, smoking status, and calendar period, HIV infection was associated with increased lung cancer risk (hazard ratio HR 3.6; 95% CI:16-79) (62). The second study used a prospective cohort by White et. al. (2007) to examine the association between anger control and negative affect with cancer risk. The

cohort included 19,730 adults and after adjustment for potential confounders, the results displayed a weak association between anger control and lung cancer, HR 1.24 (95% CI:101-152) (63).

This study focused on describing statistically significant results and it may be helpful to also consider further study of a variety of risk factors, including lifestyle and occupational, for health outcomes where the numbers of observed outcomes are large (e.g., circulatory disease), although not necessarily statistically significant.

In summary, it is recommended that the union and the company consider the conduct of a nested case-control study of lung cancer in this cohort that also includes occupational exposure assessment. This may best be achieved by undertaking this study jointly with Vale Inco to study risk factors for lung cancer in nickel workers in Ontario. In addition, either retrospective and/or prospective analysis of predictors of both fatal and non-fatal injuries within this cohort could be very valuable to guide potential prevention strategies.

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Appendix A

ICD Version 9 Codes & Description for Accidents/Poisoning/Violence

† = Road, rail, air
 * = Possibly Job Related
 □ = Suicide
 ▲ = Boating/Swimming
 ¥ = Other accidents
 ● = Assault

E800-E807: Railway Accidents

E800	Railway accident involving collision with rolling rock	†
E801	Railway accident involving collision with other object	†
E802	Railway accident involving derailment without antecedent collision	†
E803	Railway accident involving explosion, fire, or burning	†
E804	Fall in, or from railway train	†
E805	Hit by rolling stock	†
E806	Other specified railway accident	†
E807	Railway accident of unspecified nature	†

E810-E819: Motor vehicle traffic accidents

E810	Motor vehicle traffic accident involving collision with train	†
E811	Motor vehicle traffic accident involving re-entrant collision with another motor vehicle	†
E812	Other motor vehicle traffic accident involving collision with another motor vehicle	†
E813	Motor vehicle traffic accident involving collision with other vehicle	†
E814	Motor vehicle traffic accident involving collision with pedestrian	†
E815	Other motor vehicle traffic accident involving collision on the highway	†
E816	Other motor vehicle traffic accident due to loss of control without collision on the highway	†
E817	Noncollision motor vehicle traffic accident while boarding or alighting	†
E818	Other noncollision motor vehicle traffic accident	†
E819	Motor vehicle traffic accident of unspecified nature	†

E820-E825: Motor vehicle nontraffic accidents

E820	Nontraffic accident involving motor-driven snow vehicle	†
E821	Nontraffic accident involving other off-road motor vehicle	†
E822	Other motor vehicle nontraffic accident involving collision with moving object	†
E823	Other motor vehicle nontraffic accident involving collision with stationary object	†
E824	Other motor vehicle nontraffic accident while boarding or alighting	†
E825	Other motor vehicle nontraffic accident of other and unspecified nature	†

E826-E829: Other road vehicle accidents

E826	Pedal cycle accident	†
E827	Animal-drawn vehicle accident	†
E828	Accident involving animal being ridden	†
E829	Other road vehicle accidents	†

E830-E838: Water transport accidents

E830	Accident to watercraft causing submersion	▲
E831	Accident to watercraft causing other injury	▲
E832	Other accidental submersion or drowning in water transportation accident	▲

E833	Fall on stairs or ladders in water transport	▲
E834	Other fall from one level to another in water transport	▲
E835	Other and unspecified fall in water transport	▲
E836	Machinery accident in water transport	▲
E837	Explosion, fire, or burning in water craft	▲
E838	Other and unspecified water transport accident	▲
E840-E845: Air and space transport accidents		
<hr/>		
E840	Accident to powered aircraft at takeoff or landing	†
E841	Accident to powered aircraft, other and unspecified	†
E842	Accident to unpowered aircraft	†
E843	Fall in, on, or from aircraft	†
E844	Other specified air transport accidents	†
E845	Accident involving spacecraft	†
E846-E848: Vehicle accidents not elsewhere classifiable		
<hr/>		
E846	Accidents involving powered vehicles used solely within the buildings and premises of an industrial or commercial establishment	¥
E847	Accidents involving cable cars not running on rails	¥
E848	Accidents involving other vehicles not elsewhere classified	¥
E850-E858: Accidental poisoning by drugs, medicaments, and biologicals		
<hr/>		
E850	Accidental poisoning by analgesics, antipyretics, antirheumatics	¥
E851	Accidental poisoning by barbiturates	¥
E852	Accidental poisoning by other sedatives and hypnotics	¥
E853	Accidental poisoning by tranquilizers	¥
E854	Accidental poisoning by other psychotropic agents	¥
E855	Accidental poisoning by other drugs acting on central and autonomic nervous system	¥
E856	Accidental poisoning by antibiotics	¥
E857	Accidental poisoning by anti-infectives	¥
E858	Accidental poisoning by other drugs	¥
E860-E869: Accidental poisoning by other solid and liquid substances, gases, and vapors		
<hr/>		
E860	Accidental poisoning by alcohol, not elsewhere classified	¥
E861	Accidental poisoning by cleansing and polishing agents, disinfectants, paints, and varnishes	*
E862	Accidental poisoning by petroleum products, other solvents, and their vapors, not elsewhere classified	*
E863	Accidental poisoning by agricultural and horticultural chemical and pharmaceutical preparations other than plant food and fertilizers	*
E864	Accidental poisoning by corrosives and caustic, not elsewhere classified	*
E865	Accidental poisoning from foodstuffs and poisonous plants	*
E866	Accidental poisoning by other and unspecified solid and liquid substances	*
E867	Accidental poisoning by gas distributed by pipeline	*
E868	Accidental poisoning by other utility gas and other carbon monoxide	*
E869	Accidental poisoning by other gases and vapors	*
E870-E876: Misadventures to patients during surgical and medical care		
<hr/>		
E870	Accidental cut, puncture, perforation or haemorrhage during medical care	¥

E871	Foreign object left in body during procure	¥
E872	Failure of sterile precautions during procedure	¥
E873	Failure in dosage	¥
E874	Mechanical failure of instrument or apparatus during procedure	¥
E875	Contaminated or infected blood, other fluid, drug or biological substance	¥
E876	Other and unspecified misadventures during medical care	¥

E878-E879: Surgical and medical procedures an the causes of abnormal reaction of patient or later complication, without mention of misadventure at the time of procedure

E878	Surgical operation and other surgical procedure as the cause of abnormal reaction of patient, or of alter complication, without mention of misadventure at the time of operation	¥
E879	Other procedures, without mention of misadventure at the time of procedures, as the cause of abnormal reaction of patient, or of later complication	¥

E880-E888: Accidental falls

E880	Fall on or from stairs or steps	*
E881	Fall on or from ladders or scaffolding	*
E882	Fall from or out of building or other structure	*
E883	Fall into hole or other opening in surface	*
E884	Other falls from one level to another	*
E885	Fall on same level from slipping, tripping, or stumbling	*
E886	Fall on same level from collision, pushing, or shoving, by or with other person	*
E887	Fracture, cause unspecified	¥
E888	Other and unspecified falls	*

E890-E899: Accidents caused by fire and flames

E890	Conflagration in private dwelling	¥
E891	Conflagration in other and unspecified building or structure	¥
E892	Conflagration not in building or structure	¥
E893	Accident caused by ignition of clothing	¥
E894	Ignition of highly inflammable material	¥
E895	Accident caused by controlled fire in private dwelling	¥
E896	Accident caused by controlled fire in other and unspecified building or structure	¥
E897	Accident caused by controlled fire not in building or structure	¥
E898	Accident caused by other specified fire and flames	¥
E899	Accident caused by unspecified fire	¥

E900-E909: Accidents due to natural and environmental factors

E900	Excessive heat	¥
E901	Excessive cold	¥
E902	High and low air pressure and changes in air pressure	¥
E903	Travel and motion	¥
E904	Hunger, thirst, exposure, neglect	¥
E905	Venomous animals and plants as the cause of poisoning and toxic reactions	¥
E906	Other injury caused by animals	¥
E907	Lightning	¥
E908	Cataclysmic storms and floods resulting from storms	¥
E909	Cataclysmic earth surface movements and eruptions	¥

E910-E915: Accidents caused by submersion, suffocation, and foreign bodies

E910	Accidental drowning and submersion	†
E911	Inhalation and ingestion of food causing obstruction of respiratory tract or suffocation	¥
E912	Inhalation and ingestion other object obstruction of respiratory tract or suffocation	¥
E913	Accidental mechanical suffocation	*
E914	Foreign body accidentally entering eye and adnexa	¥
E915	Foreign body accidentally entering other orifice	¥

E916-E929: Other accidents

E916	Struck accidentally by falling object	*
E917	Striking against or struck accidentally by objects or persons	*
E918	Caught accidentally in or between objects	*
E919	Accidents caused by machinery	*
E920	Accidents caused by cutting and piercing instruments or objects	
E921	Accidents caused by explosion of pressure vessel	*
E922	Accidents caused by firearm missile	*
E923	Accident caused by explosive material	*
E924	Accident caused by hot substance or object, caustic or corrosive material, and steam	*
E925	Accident caused by electric current	*
E926	Exposure to radiation	¥
E927	Overexertion and strenuous movements	¥
E928	Other and unspecified environmental and accidental causes	¥
E929	Late effects of accidental injury	¥, †, *

E930-E949: Drugs, medicaments, and biological substances causing adverse effects in therapeutic use

E930	Antibiotics	¥
E931	Other anti-infectives	¥
E932	Hormones and synthetic substitutes	¥
E933	Primarily systemic agents	¥
E934	Agents primarily affecting blood constituents	¥
E935	Analgesics, antipyretics and antirheumatics	¥
E936	Anticonvulsants and anti-Parkinson drugs	¥
E937	Sedatives and hypnotics	¥
E938	Other central nervous system depressants	¥
E939	Psychotropic agents	¥
E940	Central nervous system stimulants	¥
E941	Drugs primarily affecting the autonomic nervous system	¥
E942	Agents primarily affecting the cardiovascular system	¥
E943	Agents primarily affecting gastrointestinal system	¥
E944	Water, mineral and uric acid metabolism drugs	¥
E945	Agents primarily acting on the smooth and skeletal muscles and respiratory system	¥
E946	Agents primarily affecting skin and mucous membrane, ophthalmological, otorhinolaryngological and dental drugs	¥
E947	Other and unspecified drugs and medicaments	¥
E948	Bacterial vaccines	¥

E949	Other vaccines and biological substances	¥
E950-E595: Suicide		
E950	Suicide and self inflicted poisoning by solid or liquid substances	□
E951	Suicide and self inflicted poisoning by gases in domestic use	□
E952	Suicide and self inflicted poisoning by other gases and vapours	□
E953	Suicide and self inflicted injury by hanging, strangulation and suffocation	□
E954	Suicide and self inflicted injury by submersion (drowning)	□
E955	Suicide and self inflicted injury by firearms and explosives	□
E956	Suicide and self inflicted injury by cutting and piercing instruments	□
E957	Suicide and self inflicted injuries by jumping from high place	□
E958	Suicide and self inflicted injury by other unspecified means	□
E959	Late effects of self inflicted injury	□
E960-E969: Homicide		
E960	Fight, brawl, rape	●
E961	Assault by corrosive or caustic substance, except poisoning	●
E962	Assault by poisoning	●
E963	Assault by hanging and strangulation	●
E964	Assault by submersion (drowning)	●
E965	Assault by firearms and explosives	●
E966	Assault by cutting and piercing instrument	●
E967	Child battering and other maltreatment	●
E968	Assault by other and unspecified means	●
E969	Late effects of injury purposely inflicted by other person	●
E970-E978: Legal Intervention		
E970	Injury due to legal intervention by firearms	¥
E971	Injury due to legal intervention by explosives	¥
E972	Injury due to legal intervention by gas	¥
E973	Injury due to legal intervention by blunt object	¥
E974	Injury due to legal intervention by cutting and piercing instruments	¥
E975	Injury due to legal intervention by other specified means	¥
E976	Injury due to legal intervention by unspecified means	¥
E977	Late effects of injuries due to legal intervention	¥
E978	Legal execution	¥
E980-E989: Injury Undetermined Whether Accidentally or Purposely		
E980	Poisoning by solid or liquid substances, undetermined whether accidentally or purposely inflicted	□
E981	Poisoning by gases in domestics use, undetermined whether accidentally or purposely inflicted	□
E982	Poisoning by other gases, undetermined whether accidentally or purposely inflicted	□
E983	Hanging, strangulation or suffocation, undetermined whether accidentally or purposely inflicted	□
E984	Submersion (drowning), undetermined whether accidentally or purposely inflicted	□
E985	Injury by firearms and explosives, undetermined whether accidentally or purposely inflicted	□

E986	Injury by cutting and piercing instruments, undetermined whether accidentally or purposely inflicted	<input type="checkbox"/>
E987	Falling from high place, undetermined whether accidentally or purposely inflicted	<input type="checkbox"/>
E988	Injury by other and unspecified means, undetermined whether accidentally or purposely inflicted	<input type="checkbox"/>
E989	Late effects of injury, undetermined whether accidentally or purposely inflicted	<input type="checkbox"/>

E990-E999: Injury Resulting from Operations of War

E990	Injury due to war operations by fires and conflagrations	¥
E991	Injury due to war operations by bullets and firearms	¥
E992	Injury due to war operations by explosion of marine weapons	¥
E993	Injury due to war operations by other explosion	¥
E994	Injury due to war operations by destruction of aircraft	¥
E995	Injury due to war operations by other and unspecified forms of conventional warfare	¥
E996	Injury due to war operations nuclear weapons	¥
E997	Injury due to war operations by other forms of unconventional warfare	¥
E998	Injury due to war operations but occurring after cessation of hostilities	¥
E999	Late effects of injury due to war operations	¥

Appendix B

Table 83: Sinter Plant: Overall cancer incidence with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	73	97.16	75	59-94	*
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	9	10.19	88	40-168	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	12	12.09	99	51-173	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	9	7.65	118	54-223	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

ICD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = 0<6

Table 84: Sinter Plant: Overall cancer incidence with fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	1004	1175.30	85	80-91	**
140-145	Cancer of the lip & oral cavity	24	33.99	71	45-105	
146-149	Pharynx & Ill defined upper aero-digestive	8	17.10	47	20-92	*
150	Cancer of the esophagus	11	17.62	62	31-112	
151	Cancer of the stomach	32	37.77	85	58-120	
153-154,159.0	Cancer of the colon and rectum	161	166.37	97	82-113	
157	Cancer of the pancreas	27	28.99	93	61-136	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	22	21.65	102	64-154	
162	Cancer of the lung	248	224.63	110	97-125	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	17	36.38	47	27-75	**
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	176	242.98	72	62-84	**
186	Cancer of the testis	X	X	X	X	*
189.0-189.2	Cancer of the kidney	29	35.22	82	55-118	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	56	71.61	78	59-102	
191-192	Cancer of the brain & other nervous system	21	22.95	92	57-140	
193	Cancer of the thyroid	X	X	X	X	*
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	56	48.69	115	87-149	
203	Multiple Myeloma	18	16.23	111	66-175	
204-208	Leukemia	23	33.74	68	43-102	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$ ** indicates statistical significance at $p < 0.01$ x = $O < 6$

Table 85: Cancer Incidence: Job Category 2: Milling with Start Decade of 1928

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	19	9.91	192	115-299	*
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	*
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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* indicates statistical significance at p<0.01

x = O<6

Table 86: Cancer Incidence: Job Category 2: Milling with Start Decade of 1950

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	32	55.17	58	40-82	**
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	8	7.80	103	44-202	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	*
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	6	12.00	50	18-109	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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* indicates statistical significance at p<0.01

x = O<6

Table 87: Cancer Incidence: Job Category 3: Service with Start Decade of 1940

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	44	37.64	117	85-157	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	**
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	9	7.76	116	53-220	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	9	8.16	110	50-209	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	6	1.22	493	180-1073	**
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 88: Cancer Incidence: Job Category 3: Service with Start Decade of 1960

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	82	113.75	72	57-89	**
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	10	15.60	64	31-118	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	25	20.62	121	78-179	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	10	21.39	47	22-86	*
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	*
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<E

Table 89: Cancer Incidence: Job Category 7: Office Clerical with Start Decade of 1950

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	30	43.91	68	46-98	*
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	8	9.82	81	35-161	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 90: Sinter Plant: Overall cancer mortality with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	237	226.47	105	92-119	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	30	37.82	79	54-113	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	56	56.46	99	75-129	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	7	10.48	67	27-138	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	127	93.93	135	113-161	**
140-208	All cancer sites	28	37.22	75	50-109	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	8	8.28	97	42-190	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4, 189.8 - 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	53	39.00	136	102-178	*
E830-838	Boating/ swimming	10	6.52	153	73-282	
E800-949	Possibly job related	27	10.90	248	163-360	**
E950-959	Suicide including possible suicide	30	26.91	111	75-159	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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x = O<6

Table 91: Sinter Plant: Overall cancer mortality with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	1652	1836.67	90	86-94	**
001-139	Infective and parasitic diseases	12	25.78	47	24-81	**
140-239	Neoplasms	517	564.29	92	84-100	*
240-279	Endocrine/nutritional/metabolic disease	29	51.73	56	38-81	**
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	19	26.05	73	44-114	
320-389	Nervous system/sense organ disease	17	35.92	47	28-76	**
390-459	Circulatory disease	716	741.63	97	90-104	
460-519	Respiratory disease	98	123.96	79	64-96	*
520-579	Digestive disease	54	83.04	65	49-85	**
580-629	Genitourinary disease	20	22.13	90	55-140	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	18	30.62	59	35-93	*
800-999	Accidents/poisonings/violence	145	118.18	123	104-144	*
140-208	All cancer sites	514	557.23	92	84-101	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	10	18.08	55	26-102	
151	Cancer of the stomach	18	24.53	73	43-116	
153,154,159.0	Cancer of the colon and rectum	72	72.72	99	77-125	
157	Cancer of the pancreas	22	27.67	80	50-120	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	6	7.85	76	28-166	
162	Cancer of the lung	196	178.98	110	95-126	
170	Cancer of the bone	X	X	X	X	*
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	6	8.63	70	25-151	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	31	43.94	71	48-100	*
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	13	14.01	93	49-159	
188, 189.3 -189.4, 189.8 - 189.9	Cancer of the bladder and other urinary	11	15.07	73	36-131	
191-192	Cancer of the brain and other nervous system	20	16.91	118	72-183	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	25	20.46	122	79-180	
203	Multiple myeloma	12	9.20	130	67-228	
204-208	Leukemia	12	19.12	63	32-110	
571	Cirrhosis of the liver	28	45.53	62	41-89	**
E800-848	Road, rail, air (transport except boating)	35	28.34	123	86-172	
E830-838	Boating/ swimming	7	5.12	137	55-282	
E800-949	Possibly job related	28	20.93	134	89-193	
E950-959	Suicide including possible suicide	46	40.54	113	83-151	
E970-978	Assault	7	3.69	190	76-391	
E980-989	Other accidents	22	19.57	112	70-170	

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Table 92: Mortality: Job category 2: Milling with Start Decade of 1928

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	31	22.19	140	95-198	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	13	5.76	226	120-386	*
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	14	11.00	127	70-214	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	13	5.70	228	121-390	*
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	*
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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Table 93: Mortality: Job category 2: Milling with Start Decade of 1950

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	61	83.55	73	56-94	*
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	16	26.67	60	34-97	*
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	29	33.22	87	58-125	
460-519	Respiratory disease	6	5.29	113	41-247	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	16	26.35	61	35-99	*
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 94: Mortality: Job category 3: Service with Start Decade of 1940

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	64	74.08	86	67-110	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	28	20.50	137	91-197	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	18	32.99	55	32-86	**
460-519	Respiratory disease	8	6.35	126	54-248	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	28	20.25	138	92-200	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	**
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	9	6.45	140	64-265	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	**
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 95: Mortality: Job category 3: Service with Start Decade of 1970

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	115	118.21	97	80-117	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	34	35.55	96	66-134	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	47	38.82	121	89-161	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	20	17.66	113	69-175	
140-208	All cancer sites	34	35.06	97	67-136	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	6	4.40	136	50-297	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	16	10.81	148	85-240	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	6	2.10	286	105-623	*
E950-959	Suicide including possible suicide	7	6.18	113	45-233	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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x = O<6

Table 96: Mortality: Job category 7: Office Clerical with Start Decade of 1950

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	35	75.80	46	32-64	**
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	10	22.47	45	21-82	**
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	21	31.62	66	41-102	
460-519	Respiratory disease	X	X	X	X	**
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	10	22.18	45	22-83	**
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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x = O<6

Table 97: Mortality: Job category 7: Office Clerical with Start Decade of 1960

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	72	100.48	72	56-90	**
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	30	30.09	100	67-142	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	17	36.23	47	27-75	**
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	14	12.28	114	62-191	
140-208	All cancer sites	30	29.70	101	68-144	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	9	9.24	97	44-185	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	8	3.88	206	89-407	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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Table 98: Mortality: Job category 7: Office Clerical with Start Decade of 1970

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	29	56.61	51	34-74	**
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	7	16.74	42	17-86	*
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	10	17.37	58	28-106	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	6	9.86	61	22-132	
140-208	All cancer sites	7	16.50	42	17-87	*
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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Table 99: Cancer Incidence: Non-Union with less than 15 years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	36	46.13	78	55-108	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 100: Cancer Incidence: Non-Union with fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	208	233.32	89	77-102	
140-145	Cancer of the lip & oral cavity	6	6.03	100	36-217	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	36	33.42	108	75-149	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	47	45.54	103	76-137	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	52	54.58	95	71-125	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	6	6.24	96	35-209	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	13	14.85	88	47-150	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	10	8.36	120	57-220	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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Table 101: Cancer Incidence: Union with thirty years or more employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	184	197.10	93	80-108	
140-145	Cancer of the lip & oral cavity	X	X	X		
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X		
150	Cancer of the esophagus	X	X	X		
151	Cancer of the stomach	X	X	X		
153-154,159.0	Cancer of the colon and rectum	34	28.37	120	83-167	
157	Cancer of the pancreas	X	X	X		
160	Cancer of the nose/sinus	X	X	X		
161	Cancer of the larynx	7	3.44	203	81-419	
162	Cancer of the lung	39	39.54	99	70-135	
170	Cancer of the bone	X	X	X		
171	Cancer of the connective tissue	X	X	X		
172	Malignant melanoma of the skin	X	X	X		
174-175	Cancer of the breast	X	X	X		
185	Cancer of the prostate	42	46.87	90	65-121	
186	Cancer of the testis	X	X	X		
189.0-189.2	Cancer of the kidney	X	X	X		
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	8	12.88	62	27-122	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 102: Cancer Incidence: Start Decade of 1928

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	84	83.30	101	80-125	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	12	12.54	96	49-167	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	21	17.37	121	75-185	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	17	17.25	99	57-158	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 103: Cancer Incidence: Start Decade of 1980

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	7	7.73	91	36-187	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 104: Cancer Incidence: Job Category 1: Underground Mines with thirty or more years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	94	93.78	100	81-123	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	6	3.11	193	70-420	
153-154,159.0	Cancer of the colon and rectum	15	13.56	111	62-182	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	27	19.01	142	94-207	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	16	22.23	72	41-117	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	7	3.00	233	93-481	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 105: Cancer Incidence: Job Category 2: Milling with fifteen to twenty-nine years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	20	16.52	121	74-187	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	6	2.39	251	92-545	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 106: Cancer Incidence: Job Category 3: Service with fifteen to twenty-nine years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	89	101.77	87	70-108	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	8	14.59	55	24-108	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	25	20.54	122	79-180	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	13	22.05	59	31-101	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	8	3.64	220	95-433	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 107: Cancer Incidence: Job Category 3: Service with thirty or more years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	28	24.71	113	75-164	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	9	5.01	180	82-341	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	11	5.85	188	94-337	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 108: Cancer Incidence: Job Category 4: Smelter with fifteen to twenty-nine years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	64	69.17	93	71-118	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	14	9.93	141	77-236	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	17	14.19	120	70-192	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	8	14.08	57	24-112	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 109: Cancer Incidence: Job Category 4: Smelter with thirty or more years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	49	39.44	124	92-164	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	7	5.71	123	49-252	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	8	7.97	100	43-198	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	13	9.31	140	74-239	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = 0<6

Table 110: Cancer Incidence: Job Category 5: Administration with fifteen to twenty-nine years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	29	29.58	98	66-141	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	7	4.27	164	66-338	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	7	5.95	118	47-242	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 111: Cancer Incidence: Job Category 6: Falconbridge Sinter Plant with six months to fourteen years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	30	28.75	104	70-149	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	6	5.83	103	38-224	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 112: Cancer Incidence: Job Category 7: Office Clerical with six months to fourteen years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	114	120.31	95	78-114	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	17	16.48	103	60-165	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	19	21.54	88	53-138	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	27	22.66	119	79-173	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	6	6.98	86	31-187	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	10	5.62	178	85-327	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 113: Cancer Incidence: Job Category 8: Production and Maintenance with six months to fourteen years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	83	93.38	89	71-110	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	11	13.27	83	41-148	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	26	18.35	142	93-208	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	14	19.00	74	40-124	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 114: Cancer Incidence: Job Category 8: Production and Maintenance with fifteen to twenty-nine years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	6	10.06	60	22-130	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = 0<6

Table 115: Cancer Incidence: Job Category 1: Underground Mines with Start Decade of 1928

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	34	40.72	84	58-117	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	6	6.14	98	35-213	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	7	8.42	83	33-171	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	7	8.51	82	33-169	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at $p < 0.01$

x = $O < 6$

Table 116: Cancer Incidence: Job Category 1: Underground Mines with Start Decade of 1960

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	203	208.22	97	85-112	
140-145	Cancer of the lip & oral cavity	7	6.65	105	42-217	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	6	6.11	98	36-214	
153-154,159.0	Cancer of the colon and rectum	27	28.00	96	64-140	
157	Cancer of the pancreas	9	4.72	191	87-362	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	47	35.20	134	98-178	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	6	9.54	63	23-137	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	38	37.03	103	73-141	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	6	7.30	82	30-179	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	8	11.08	72	31-142	
191-192	Cancer of the brain & other nervous system	6	5.66	106	39-231	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	8	10.87	74	32-145	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<E

Table 117: Cancer Incidence: Job Category 1: Underground Mines with Start Decade of 1980

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	12	14.90	81	42-141	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 118: Cancer Incidence: Job Category 2: Milling with Start Decade of 1940

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	12	16.85	71	37-124	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 119: Cancer Incidence: Job Category 2: Milling with Start Decade of 1960

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	52	67.18	77	58-102	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	7	9.01	78	31-160	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	13	11.26	115	61-197	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	8	11.58	69	30-136	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 120: Cancer Incidence: Job Category 2: Milling with Start Decade of 1970

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	49	51.10	96	71-127	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	7	6.64	105	42-217	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	14	7.95	176	96-295	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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 x = 0<6

Table 121: Cancer Incidence: Job Category 2: Milling with Start Decade of 1980

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	6	8.77	68	25-149	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 122: Cancer Incidence: Job Category 3: Service with Start Decade of 1928

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	22	19.39	113	71-172	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	6	3.96	151	55-330	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 123: Cancer Incidence: Job Category 3: Service with Start Decade of 1950

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	88	108.28	81	65-100	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	9	15.50	58	27-110	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	28	22.13	127	84-183	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	*
185	Cancer of the prostate	17	23.13	73	43-118	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 124: Cancer Incidence: Job Category 3: Service with Start Decade of 1970

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	69	83.04	83	65-105	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	10	11.13	90	43-165	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	17	14.14	120	70-193	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	12	14.73	81	42-142	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = 0<6

Table 125: Cancer Incidence: Job Category 4: Smelter with Start Decade of 1928

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	20	22.98	87	53-134	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	6	4.77	126	46-274	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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 x = 0<6

Table 126: Cancer Incidence: Job Category 4: Smelter with Start Decade of 1940

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	56	43.87	128	96-166	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	7	6.34	110	44-228	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	15	9.33	161	90-265	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	9	9.10	99	45-188	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = 0<6

Table 127: Cancer Incidence: Job Category 4: Smelter with Start Decade of 1970

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	50	59.73	84	62-110	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	10	7.64	131	63-241	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	12	8.76	137	71-239	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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 ** indicates statistical significance at p<0.01
 x = O<6

Table 128: Cancer Incidence: Job Category 4: Smelter with Start Decade of 1980

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	6	8.83	68	25-148	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01

x = 0<6

Table 129: Cancer Incidence: Job Category 6: Falconbridge Sinter Plant with Start Decade of 1940

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	9	5.68	159	72-301	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	*
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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 ** indicates statistical significance at p<0.01
 x = O<6

Table 130: Cancer Incidence: Job Category 6: Falconbridge Sinter Plant with Start Decade of 1950

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	14	12.83	109	60-183	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 131: Cancer Incidence: Job Category 6: Falconbridge Sinter Plant with Start Decade of 1960

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	14	13.04	107	59-180	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01

x = 0<6

Table 132: Cancer Incidence: Job Category 6: Falconbridge Sinter Plant with Start Decade of 1970

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	12	13.95	86	44-150	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 133: Cancer Incidence: Job Category 7: Office Clerical with Start Decade of 1928

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	9	6.83	132	60-250	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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 x = O<6

Table 134: Cancer Incidence: Job Category 7: Office Clerical with Start Decade of 1940

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	10	9.39	107	51-196	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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 x = O<6

Table 135: Cancer Incidence: Job Category 7: Office Clerical with Start Decade of 1960

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	57	67.14	85	64-110	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	6	9.22	65	24-142	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	11	11.97	92	46-164	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	10	12.83	78	37-143	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = 0<6

Table 136: Cancer Incidence: Job Category 7: Office Clerical with Start Decade of 1970

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	29	40.74	71	48-102	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	6	5.38	112	41-243	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	8	6.74	119	51-234	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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Table 137: Cancer Incidence: Job Category 8: Production and Maintenance with Start Decade of 1928

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	6	7.36	82	30-178	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	*
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	-
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 138: Cancer Incidence: Job Category 8: Production and Maintenance with Start Decade of 1960

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	20	27.38	73	45-113	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	6	5.67	106	39-230	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	9	5.66	159	73-302	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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 x = O<6

Table 139: Cancer Incidence: Job Category 8: Production and Maintenance with Start Decade of 1970

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	28	38.47	73	48-105	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	6	5.23	115	42-250	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	10	6.87	146	70-268	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01

x = 0<6

Table 140: Cancer Incidence: Job Category 8: Production and Maintenance with Start Decade of 1980

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	13	15.18	86	46-146	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 141: Cancer Incidence: Non-Union: Job Category 1: Underground Mines with fifteen or more years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	73	78.92	92	72-116	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	10	11.30	89	42-163	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	18	15.42	117	69-185	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	19	18.72	102	61-159	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 142: Cancer Incidence: Non-Union; Job Category 2: Milling with fifteen or more years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	17	21.08	81	47-129	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	6	3.03	198	72-431	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	6	5.03	119	44-259	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 143: Cancer Incidence: Non-Union; Job Category 3: Service with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	11	9.77	113	56-201	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 144: Cancer Incidence: Non-Union; Job Category 3: Service with fifteen or more years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	35	38.42	91	63-127	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	11	7.52	146	73-262	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	9	9.31	97	44-184	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = 0<6

Table 145: Cancer Incidence: Non-Union; Job Category 4: Smelter with fifteen or more years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	34	33.50	101	70-142	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	7	6.58	106	43-219	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	6	7.73	78	28-169	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 146: Cancer Incidence: Non-Union; Job Category 5: Administration with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	23	28.89	80	50-119	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 147: Cancer Incidence: Non-Union; Job Category 7: Office Clerical with fifteen or more years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	6	2.73	219	80-478	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	*
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 148: Cancer Incidence: Union; Job Category 2: Milling with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	22	28.63	77	48-116	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	6	4.28	140	51-305	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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Table 149: Cancer Incidence: Union; Job Category 3: Service with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	35	47.72	73	51-102	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	6	5.92	101	37-221	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	9	8.19	110	50-209	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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Table 150: Cancer Incidence: Union; Job Category 6: Falconbridge Sinter Plant with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	6	5.61	107	39-233	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 151: Cancer Incidence: Union; Job Category 6: Falconbridge Sinter Plant with fifteen or more years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	44	41.01	107	78-144	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	6	5.87	102	37-223	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	7	8.17	86	34-177	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	9	9.03	100	45-189	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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Table 152: Cancer Incidence: Union; Job Category 7: Office Clerical with fifteen or more years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	127	150.99	84	70-100	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	20	21.27	94	57-145	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	21	27.72	76	47-116	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	-X	X	X	
185	Cancer of the prostate	31	32.60	95	65-135	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	8	8.94	90	39-176	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	-X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	10	6.47	155	74-284	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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Table 153: Cancer Incidence: Union; Job Category 8: Production and Maintenance with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	24	34.16	70	45-105	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	10	6.88	145	70-267	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 154: Mortality: Non-Union with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	68	82.84	82	64-104	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	20	21.15	95	58-146	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	34	32.08	106	73-148	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	*
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	12	14.32	84	43-146	
140-208	All cancer sites	19	20.95	91	55-142	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4, 189.8 - 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

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E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 155: Mortality: Union with thirty or more years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	319	332.31	96	86-107	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	91	101.38	90	72-110	
240-279	Endocrine/nutritional/metabolic disease	8	9.33	86	37-169	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	154	143.82	107	91-125	
460-519	Respiratory disease	23	26.95	85	54-128	
520-579	Digestive disease	12	13.34	90	46-157	
580-629	Genitourinary disease	6	4.59	131	48-285	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	17	12.11	140	82-225	
140-208	All cancer sites	91	100.14	91	73-112	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	14	13.36	105	57-176	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	34	32.67	104	72-145	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	7	9.81	71	29-147	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	6	6.26	96	35-209	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	7	3.37	208	83-429	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 156: Mortality: Start Decade of 1928

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	204	219.14	93	81-107	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	53	51.65	103	77-134	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	103	108.72	95	77-115	
460-519	Respiratory disease	19	22.00	86	52-135	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	6	3.56	168	62-367	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	10	7.68	130	62-240	
140-208	All cancer sites	53	51.03	104	78-136	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper acro digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	21	15.12	139	86-212	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	6	6.74	89	33-194	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

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** indicates statistical significance at p<0.01

x = O<6

Table 157: Mortality: Start Decade of 1940

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	353	347.56	102	91-113	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	103	96.42	107	87-130	
240-279	Endocrine/nutritional/metabolic disease	6	8.77	68	25-149	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	*
390-459	Circulatory disease	175	158.28	111	95-128	
460-519	Respiratory disease	26	28.92	90	59-132	
520-579	Digestive disease	11	14.10	78	39-140	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	19	15.82	120	72-188	
140-208	All cancer sites	102	95.26	107	87-130	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	12	12.82	94	48-164	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	38	30.66	124	88-170	
170	Cancer of the bone	X	X	X	X	*
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	9	9.92	91	41-172	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	7	2.95	237	95-489	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	6	6.56	91	33-199	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	7	4.20	167	67-344	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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x = O<6

Table 158: Mortality: Job Category 1: Underground Mines with fifteen to twenty-nine years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	426	427.72	100	90-110	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	135	127.42	106	89-125	
240-279	Endocrine/nutritional/metabolic disease	11	11.37	97	48-173	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	197	182.73	108	93-124	
460-519	Respiratory disease	27	30.93	87	58-127	
520-579	Digestive disease	12	18.94	63	33-111	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	29	23.77	122	82-175	
140-208	All cancer sites	134	125.90	106	89-126	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	18	16.60	108	64-171	
157	Cancer of the pancreas	6	6.28	96	35-208	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	52	40.98	127	95-166	
170	Cancer of the bone	X	X	X	X	*
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	7	10.82	65	26-133	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	8	3.48	230	99-453	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	8	10.04	80	34-157	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	9	4.77	189	86-358	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	7	4.07	172	69-354	

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x = O<6

Table 159: Mortality: Job Category 2: Milling with six months to fourteen years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	174	184.95	94	81-109	
001-139	Infective and parasitic diseases	X	X	X	X	*
140-239	Neoplasms	48	54.72	88	65-116	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	70	62.72	112	87-141	
460-519	Respiratory disease	8	9.02	89	38-175	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	34	27.47	124	86-173	
140-208	All cancer sites	47	53.99	87	64-116	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	7	6.78	103	41-213	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	20	16.66	120	73-185	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	10	9.23	108	52-199	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	15	9.07	165	92-273	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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x = O<6

Table 160: Mortality: Job Category 2: Milling with thirty or more years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	33	28.54	116	80-162	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	15	8.59	175	98-288	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	12	12.68	95	49-165	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	15	8.50	177	99-291	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	*
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	*
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	*
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 161: Mortality: Job Category 3: Service with fifteen to twenty-nine years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	160	171.45	93	79-109	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	52	51.82	100	75-132	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	65	73.06	89	69-113	
460-519	Respiratory disease	15	12.79	117	66-193	
520-579	Digestive disease	6	7.38	81	30-177	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	10	8.71	115	55-211	
140-208	All cancer sites	52	51.20	102	76-133	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	20	16.74	119	73-185	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4, 189.8 – 189.9	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 162: Mortality: Job Category 3: Service with thirty or more years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	38	39.31	97	68-133	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	16	12.51	128	73-208	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	13	16.77	78	41-133	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	16	12.36	129	74-210	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	8	4.12	194	84-383	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9
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CI = Confidence Interval
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** indicates statistical significance at p<0.01
x = O<6

Table 163: Mortality: Job Category 4: Smelter with thirty or more years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	72	73.03	99	77-124	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	27	21.06	128	84-187	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	29	32.63	89	60-128	
460-519	Respiratory disease	7	6.36	110	44-227	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	27	20.81	130	85-189	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	10	6.67	150	72-276	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = 0<6

Table 164: Mortality: Job Category 6: Falconbridge Sinter Plant with six months to fourteen years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	56	47.40	118	89-153	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	19	14.23	134	80-209	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	25	19.70	127	82-187	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	19	14.06	135	81-211	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 165: Mortality: Job Category 6: Falconbridge Sinter Plant with fifteen to twenty-nine years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	10	6.29	159	76-292	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	6	2.97	202	74-440	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	*
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 166: Mortality: Job Category 7: Office Clerical with thirty years or more employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	7	8.20	85	34-176	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 167: Mortality: Job Category 8: Production and Maintenance with fifteen to twenty-nine years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	20	23.07	87	53-134	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	*
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	11	10.91	101	50-180	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	*
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 168: Mortality: Job Category 1: Underground Mines with Start Decade of 1928

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	92	110.37	83	67-102	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	16	25.64	62	36-101	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	50	54.83	91	68-120	
460-519	Respiratory disease	11	11.31	97	48-174	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	16	25.32	63	36-103	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	6	7.39	81	30-177	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 169: Mortality: Job Category 1: Underground Mines with Start Decade of 1980

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	20	18.97	105	64-163	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	8	5.25	153	66-301	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	6	3.31	181	66-394	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 170: Mortality: Job Category 2: Milling with Start Decade of 1960

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	98	98.36	100	81-121	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	30	28.54	105	71-150	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	35	32.10	109	76-152	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	17	16.36	104	60-166	
140-208	All cancer sites	29	28.15	103	69-148	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	6	3.51	171	62-372	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	11	8.48	130	65-232	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	6	5.15	117	43-254	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 171: Mortality: Job Category 2: Milling with Start Decade of 1970

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	75	73.03	103	81-129	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	25	20.67	121	78-179	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	23	21.52	107	68-160	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	22	14.30	154	96-233	
140-208	All cancer sites	25	20.36	123	79-181	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper acro digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	11	5.94	185	92-331	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	9	4.77	189	86-358	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	9	5.01	180	82-341	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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SMR = Standardized Mortality Ratio

CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 172: Mortality: Job Category 2: Milling with Start Decade of 1980

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	10	10.70	93	45-172	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 173: Mortality: Job Category 3: Service with Start Decade of 1928

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	51	49.52	103	77-135	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	15	11.87	126	0.71	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	24	24.55	98	63-145	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	15	11.73	128	72-211	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	6	3.54	170	62-369	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	*
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 174: Mortality: Job Category 3: Service with Start Decade of 1950

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	175	182.72	96	82-111	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	53	55.16	96	72-126	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	84	77.48	108	86-134	
460-519	Respiratory disease	11	13.05	84	42-151	
520-579	Digestive disease	6	8.11	74	27-161	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	14	10.82	129	71-217	
140-208	All cancer sites	53	54.51	97	73-127	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	8	7.16	112	48-220	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	22	17.96	122	77-185	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	6	2.92	206	75-447	
E830-838	Boating/ swimming	X	X	X	X	*
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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SMR = Standardized Mortality Ratio

CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 175: Mortality: Job Category 3: Service with Start Decade of 1960

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	157	165.64	95	81-111	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	43	50.66	85	61-114	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	68	59.09	115	89-146	
460-519	Respiratory disease	11	8.44	130	65-233	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	15	21.11	71	40-117	
140-208	All cancer sites	43	50.02	86	62-116	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	6	6.34	95	35-206	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	19	15.89	120	72-187	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	6	7.20	83	30-181	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	6	6.68	90	33-196	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

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E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 176: Mortality: Job Category 3: Service with Start Decade of 1980

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	10	12.70	79	38-145	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = 0<6

Table 177: Mortality: Job Category 4: Smelter with Start Decade of 1928

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	56	60.57	92	70-120	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	16	14.32	112	64-181	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	28	29.83	94	62-136	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	16	14.14	113	65-184	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	7	4.17	168	67-346	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 178: Mortality: Job Category 4: Smelter with Start Decade of 1950

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	194	204.63	95	82-109	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	57	64.99	88	66-114	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	89	82.89	107	86-132	
460-519	Respiratory disease	10	13.21	76	36-139	
520-579	Digestive disease	7	9.63	73	29-150	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	21	13.52	155	96-237	
140-208	All cancer sites	56	64.23	87	66-113	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	14	8.30	169	92-283	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	20	21.52	93	57-144	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	*
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	*
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	7	4.13	169	68-349	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

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SMR = Standardized Mortality Ratio

CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 179: Mortality: Job Category 4: Smelter with Start Decade of 1970

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	78	80.94	96	76-120	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	24	22.66	106	68-158	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	21	21.38	98	61-150	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	23	18.75	123	78-184	
140-208	All cancer sites	24	22.32	108	69-160	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	11	6.30	175	87-313	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	7	6.32	111	44-228	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	6	6.65	90	33-196	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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x = O<6

Table 180: Mortality: Job Category 4: Smelter with Start Decade of 1980

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	6	10.61	57	21-123	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper acro digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 181: Mortality: Job Category 6: Falconbridge Sinter Plant with Start Decade of 1950

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	26	22.67	115	75-168	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	7	6.73	104	42-214	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	15	10.01	150	84-247	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	7	6.65	105	42-217	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 182: Mortality: Job Category 6: Falconbridge Sinter Plant with Start Decade of 1970

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	16	18.22	88	50-143	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	6	6.00	100	36-218	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	7	6.22	112	45-232	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	6	5.93	101	37-220	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 183: Mortality: Job Category 7: Office Clerical with Start Decade of 1928

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	13	16.57	78	42-134	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	6	8.33	72	26-157	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	*
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

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E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 184: Mortality: Job Category 7: Office Clerical with Start Decade of 1940

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	12	20.94	57	30-100	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

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E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 185: Mortality: Job Category 7: Office Clerical with Start Decade of 1980

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	7	10.04	70	28-144	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

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SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = 0<6

Table 186: Mortality: Job Category 8: Production and Maintenance with Start Decade of 1960

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	55	52.29	105	79-137	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	11	14.74	75	37-134	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	31	23.58	131	89-187	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	11	14.57	76	38-135	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	6	4.71	127	47-278	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 187: Mortality: Job Category 8: Production and Maintenance with Start Decade of 1980

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	13	18.00	72	38124	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	6	6.48	93	34-201	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	6	6.40	94	34-204	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper acro digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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x = O<6

Table 188: Mortality: Non-Union; Job Category 2: Milling with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	8	7.96	100	43-198	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	**
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	**
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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x = O<6

Table 189: Mortality: Non-Union; Job Category 2: Milling with fifteen or more years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	25	35.22	71	46-105	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	10	10.79	93	44-170	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	10	15.14	66	032-121	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	10	10.65	94	45-173	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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x = O<6

Table 190: Mortality: Non-Union; Job Category 3: Service with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	14	16.40	85	47-143	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	8	4.52	177	76-349	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	8	4.48	179	77-352	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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CI = Confidence Interval

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x = O<E

Table 191: Mortality: Non-Union; Job Category 4: Smelter with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	7	10.93	64	26-132	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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E = Expected number of cases

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CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 192: Mortality: Non-Union; Job Category 4: Smelter with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	49	57.90	85	63-112	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	16	17.19	93	53-151	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	24	25.17	95	61-142	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	16	16.98	94	54-153	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	7	5.43	129	52-265	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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x = O<6

Table 193: Mortality: Union; Job Category 2: Milling with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	61	58.31	105	80-134	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	14	11.75	119	65-200	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	16	15.77	101	58-165	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	24	20.59	117	75-173	
140-208	All cancer sites	14	11.59	121	66-203	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	12	8.54	141	73-246	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	6	5.95	101	37-219	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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Table 194: Mortality: Union; Job Category 2: Milling with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	240	266.85	90	79-102	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	78	83.00	94	74-117	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	*
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	105	102.41	103	84-124	
460-519	Respiratory disease	15	16.84	89	50-147	
520-579	Digestive disease	9	12.44	72	33-137	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	22	20.02	110	69-166	
140-208	All cancer sites	77	81.92	94	74-117	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	14	10.59	132	72-222	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	28	25.88	108	72-156	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	6	5.91	101	37-221	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	12	7.25	165	85-289	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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Table 195: Mortality: Union; Job Category 4: Smelter with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	56	68.56	82	62-106	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	9	13.43	67	31-127	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	14	17.53	80	44-134	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	27	25.19	107	71-156	
140-208	All cancer sites	9	13.23	68	31-129	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	9	10.14	89	41-169	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	6	7.45	80	29-175	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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Table 196: Mortality: Union; Job Category 6: Falconbridge Sinter Plant with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	11	11.04	100	50-178	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	6	4.13	145	53-316	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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x = O<6

Table 197: Mortality: Union; Job Category 8: Production and Maintenance with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	56	58.73	95	72-124	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	10	16.14	62	30-114	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	34	23.84	143	99-199	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	10	15.98	63	30-115	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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Table 198: Incidence: Union with less than six months exposure

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	7	11.86	59	24-122	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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Table 199: Cancer Incidence: Start Decade of 1990

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 200: Incidence: Job Category 1: Underground Mines with less than six months exposure

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	17	38.14	45	26-71	**
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	6	6.26	96	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 201: Incidence: Job Category 2: Milling with less than six months exposure

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	36	42.29	0.85	60-118	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	9	7.20	1.25	57-237	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	7	7.57	0.92	37-190	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = 0<6

Table 202: Incidence: Job Category 3: Service with less than six months exposure

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	41	53.03	77	55-105	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	11	9.33	118	59-211	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	*
185	Cancer of the prostate	6	9.55	63	23-137	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 203: Incidence: Job Category 4: Smelter with less than six months exposure

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	48	52.56	91	67-121	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	11	7.06	156	78-279	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	12	8.99	134	69-233	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	7	9.20	76	30-157	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 204: Incidence: Job Category 5: Administration with less than six months exposure

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 205: Cancer Incidence: Job Category 5: Administration with more than thirty years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	*
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 206: Incidence: Job Category 6: Falconbridge Sinter Plant with less than six months exposure

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	18	14.46	125	74-197	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 207: Cancer Incidence: Job Category 6: Falconbridge Sinter Plant with fifteen to twenty-nine years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	*
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at $p < 0.01$
x = $O < E$

Table 208: Cancer Incidence: Job Category 6: Falconbridge Sinter Plant with thirty or more years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 209: Incidence: Job Category 7: Office Clerical with less than six years exposure

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	9	20.41	44	20-84	**
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 210: Cancer Incidence: Job Category 7: Office Clerical with thirty or more years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 211: Incidence: Job Category 8: Production and Maintenance with less than six years exposure

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	19	36.05	53	32-82	**
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	12	6.70	179	92-313	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 212: Cancer Incidence: Job Category 8: Production and Maintenance with thirty or more years employment

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 213: Cancer Incidence: Job Category 1: Underground Mines with Start Decade of 1990

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 214: Cancer Incidence: Job Category 2: Milling with Start Decade of 1990

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6

Table 215: Cancer Incidence: Job Category 3: Service with Start Decade of 1980

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6

Table 216: Cancer Incidence: Job Category 3: Service with Start Decade of 1990

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9
 O = Observed number of cases
 E = Expected number of cases
 SMR = Standardized Mortality Ratio

CI = Confidence Interval
 * indicates statistical significance at p<0.05
 ** indicates statistical significance at p<0.01
 x = O<6

Table 217: Cancer Incidence: Job Category 4: Smelter with Start Decade of 1990

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6

Table 218: Cancer Incidence: Job Category 5: Administration with Start Decade of 1960

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 219: Cancer Incidence: Job Category 5: Administration with Start Decade of 1970

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9
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E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6

Table 220: Cancer Incidence: Job Category 5: Administration with Start Decade of 1980

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 221: Cancer Incidence: Job Category 5: Administration with Start Decade of 1990

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 222: Cancer Incidence: Job Category 6: Falconbridge Sinter Plant with Start Decade of 1928

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6

Table 223: Cancer Incidence: Job Category 6: Falconbridge Sinter Plan with, Start Decade of 1980

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 224: Cancer Incidence: Job Category 7: Office Clerical with Start Decade of 1980

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9
 O = Observed number of cases
 E = Expected number of cases
 SMR = Standardized Mortality Ratio

CI = Confidence Interval
 * indicates statistical significance at p<0.05
 ** indicates statistical significance at p<0.01
 x = O<6

Table 225: Cancer Incidence: Job Category 7: Office Clerical with Start Decade of 1990

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9
O = Observed number of cases
E = Expected number of cases
SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6

Table 226: Cancer Incidence: Job Category 8: Production and Maintenance with Start Decade of 1990

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at $p < 0.05$

** indicates statistical significance at $p < 0.01$

x = O < 6

Table 227: Cancer Incidence: Non-Union; Job Category 2: Milling with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	*
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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SMR = Standardized Mortality Ratio

CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6

Table 228: Cancer Incidence: Non-Union; Job Category 4: Smelter with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = O<6

Table 229: Cancer Incidence: Non-Union; Job Category 7: Office Clerical with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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CI = Confidence Interval
* indicates statistical significance at p<0.05
** indicates statistical significance at p<0.01
x = 0<6

Table 230: Cancer Incidence: Non-Union; Job Category 8: Production and Maintenance with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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CI = Confidence Interval
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** indicates statistical significance at p<0.01
x = O<6

Table 231: Cancer Incidence: Non-Union; Job Category 8: Production and Maintenance with less than fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 232: Cancer Incidence: Union; Job Category 5: Administration with less than fifteen years since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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** indicates statistical significance at p<0.01
x = O<6

Table 233: Cancer Incidence: Union; Job Category 5: Administration with fifteen years or more since first hire

ICD-9	Cancer sites	O	E	SIR	95% CI	SIG
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip & oral cavity	X	X	X	X	
146-149	Pharynx & Ill defined upper aero-digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153-154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinus	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188,188.3,189.4,189.8,189.9	Cancer of the bladder & other urinary system	X	X	X	X	
191-192	Cancer of the brain & other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's Disease	X	X	X	X	
200,202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple Myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	

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x = O<6

Table 234: Mortality: Union with less than six months exposure

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	10	26.74	37	18-69	**
001-139	Infective and parasitic diseases	X	X	X		
140-239	Neoplasms	X	X	X		*
240-279	Endocrine/nutritional/metabolic disease	X	X	X		
280-289	Blood diseases	X	X	X		
290-319	Mental Disorders	X	X	X		
320-389	Nervous system/sense organ disease	X	X	X		
390-459	Circulatory disease	7	10.12	69	28-142	
460-519	Respiratory disease	X	X	X		
520-579	Digestive disease	X	X	X		
580-629	Genitourinary disease	X	X	X		
630-709	Skin/subcutaneous tissue disease	X	X	X		
710-731	Musculoskeletal disease	X	X	X		
780-799	Symptoms/ill-defined	X	X	X		
800-999	Accidents/poisonings/violence	X	X	X		
140-208	All cancer sites	X	X	X		*
140-145	Cancer of the lip and oral cavity	X	X	X		
146-149	Pharynx and ill-defined upper aero digestive	X	X	X		
150	Cancer of the esophagus	X	X	X		
151	Cancer of the stomach	X	X	X		
153,154,159.0	Cancer of the colon and rectum	X	X	X		
157	Cancer of the pancreas	X	X	X		
160	Cancer of the nose/sinuses	X	X	X		
161	Cancer of the larynx	X	X	X		
162	Cancer of the lung	X	X	X		
170	Cancer of the bone	X	X	X		
171	Cancer of the connective tissue	X	X	X		
172	Malignant melanoma of the skin	X	X	X		
174-175	Cancer of the breast	X	X	X		
185	Cancer of the prostate	X	X	X		
186	Cancer of the testis	X	X	X		
189.0-189.2	Cancer of the kidney	X	X	X		
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X		
191-192	Cancer of the brain and other nervous system	X	X	X		
193	Cancer of the thyroid	X	X	X		
201	Hodgkin's disease	X	X	X		
200, 202	Non-Hodgkin's lymphoma	X	X	X		
203	Multiple myeloma	X	X	X		
204-208	Leukemia	X	X	X		
571	Cirrhosis of the liver	X	X	X		
E800-848	Road, rail, air (transport except boating)	X	X	X		
E830-838	Boating/ swimming	X	X	X		
E800-949	Possibly job related	X	X	X		
E950-959	Suicide including possible suicide	X	X	X		
E970-978	Assault	X	X	X		
E980-989	Other accidents	X	X	X		

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** indicates statistical significance at p<0.01

x = O<6

Table 235: Mortality: Start Decade of 1980

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	*
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 236: Mortality: Start Decade of 1990

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 237: Mortality: Job Category 1: Underground Mines with less than six years exposure

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	47	58.67	80	59-107	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	9	16.17	56	25-106	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	18	18.81	96	57-151	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	12	11.30	106	55-186	
140-208	All cancer sites	9	15.95	56	26-107	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	6	3.50	171	63-373	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

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E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 238: Mortality: Job Category 2: Milling with less than six months exposure

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	53	65.70	81	60-106	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	21	18.69	112	70	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	14	22.59	62	34-104	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	9	9.64	93	43-177	
140-208	All cancer sites	21	18.43	114	71-174	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	8	5.56	144	62-283	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 239: Mortality: Job Category 3: Service with less than six months exposure

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	69	89.09	77	60-98	*
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	22	24.52	90	56-136	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	30	33.30	90	61-129	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	*
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	9	11.41	79	36-150	
140-208	All cancer sites	22	24.19	91	57-138	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	7	7.31	96	38-197	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 240: Mortality: Job Category 4: Smelter with less than six months exposure

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	69	79.26	87	68-110	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	21	22.82	92	57-141	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	23	26.91	85	54-128	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	12	12.10	99	51-173	
140-208	All cancer sites	21	22.51	93	58-143	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	10	6.87	146	70-268	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 241: Mortality: Job Category 5: Administration with less than six months exposure

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	**
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6

Table 242: Mortality: Job Category 5: Administration with thirty or more years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 243: Mortality: Job Category 6: Falconbridge Sinter Plant with less than six months exposure

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	28	20.96	134	89-193	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	10	6.62	151	72-278	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	13	8.05	162	86-276	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	10	6.54	153	73-281	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	**
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 244: Mortality: Job Category 6: Falconbridge Sinter Plant with thirty or more years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 245: Mortality: Job Category 7: Office Clerical with less than six months exposure

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	10	32.05	31	15-57	**
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	**
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	**
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 246: Mortality: Job Category 8: Production and Maintenance with less than six months exposure

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	56	56.24	100	75-129	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	15	16.82	89	50-147	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	28	21.63	129	86-187	
460-519	Respiratory disease	6	3.51	171	63-373	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	15	16.60	90	51-149	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	12	5.28	227	117-397	*
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 247: Mortality: Job Category 8: Production and Maintenance with thirty or more years employment

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 248: Mortality: Job Category 1: Underground Mines with Start Decade of 1990

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 249: Mortality: Job Category 2: Milling with Start Decade of 1940

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	26	37.08	70	46-103	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	17	17.10	99	58-159	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	*
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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SMR = Standardized Mortality Ratio

CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 250: Mortality: Job Category 2: Milling with Start Decade of 1990

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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SMR = Standardized Mortality Ratio

CI = Confidence Interval

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** indicates statistical significance at p<0.01

x = O<6

Table 251: Mortality: Job Category 3: Service with Start Decade of 1990

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	*
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 252: Mortality: Job Category 4: Smelter with Start Decade of 1990

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 253: Mortality: Job Category 5: Administration with Start Decade of 1960

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aereo digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 254: Mortality: Job Category 5: Administration with Start Decade of 1970

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 255: Mortality: Job Category 5: Administration with Start Decade of 1980

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = 0<6

Table 256: Mortality: Job Category 5: Administration with Start Decade of 1990

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 257: Mortality: Job Category 6: Falconbridge Sinter Plant with Start Decade of 1928

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 258: Mortality: Job Category 6: Falconbridge Sinter Plant with Start Decade of 1980

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 259: Mortality: Job Category 7: Office Clerical with Start Decade of 1990

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 260: Mortality: Job Category 8: Production and Maintenance with Start Decade of 1990

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer or the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 261: Mortality: Non-Union; Job Category 7: Office Clerical with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	*
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 262: Mortality: Non-Union; Job Category 7: Office Clerical with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

O = Observed number of cases

E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 263: Mortality: Non-Union; Job Category 8: Production and Maintenance with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	*
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

CD-9 = International Classification of Diseases-Version 9

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E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<E

Table 264: Mortality: Non-Union; Job Category 8: Production and Maintenance with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 –189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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E = Expected number of cases

SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 265: Mortality: Union; Job Category 5: Administration with less than fifteen years since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3 -189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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SMR = Standardized Mortality Ratio

CI = Confidence Interval

* indicates statistical significance at p<0.05

** indicates statistical significance at p<0.01

x = O<6

Table 266: Mortality: Union; Job Category 5: Administration with fifteen years or more since first hire

ICD-9	CAUSE	O	E	SMR	95% CI	SIG
	All causes	X	X	X	X	
001-139	Infective and parasitic diseases	X	X	X	X	
140-239	Neoplasms	X	X	X	X	
240-279	Endocrine/nutritional/metabolic disease	X	X	X	X	
280-289	Blood diseases	X	X	X	X	
290-319	Mental Disorders	X	X	X	X	
320-389	Nervous system/sense organ disease	X	X	X	X	
390-459	Circulatory disease	X	X	X	X	
460-519	Respiratory disease	X	X	X	X	
520-579	Digestive disease	X	X	X	X	
580-629	Genitourinary disease	X	X	X	X	
630-709	Skin/subcutaneous tissue disease	X	X	X	X	
710-731	Musculoskeletal disease	X	X	X	X	
780-799	Symptoms/ill-defined	X	X	X	X	
800-999	Accidents/poisonings/violence	X	X	X	X	
140-208	All cancer sites	X	X	X	X	
140-145	Cancer of the lip and oral cavity	X	X	X	X	
146-149	Pharynx and ill-defined upper aero digestive	X	X	X	X	
150	Cancer of the esophagus	X	X	X	X	
151	Cancer of the stomach	X	X	X	X	
153,154,159.0	Cancer of the colon and rectum	X	X	X	X	
157	Cancer of the pancreas	X	X	X	X	
160	Cancer of the nose/sinuses	X	X	X	X	
161	Cancer of the larynx	X	X	X	X	
162	Cancer of the lung	X	X	X	X	
170	Cancer of the bone	X	X	X	X	
171	Cancer of the connective tissue	X	X	X	X	
172	Malignant melanoma of the skin	X	X	X	X	
174-175	Cancer of the breast	X	X	X	X	
185	Cancer of the prostate	X	X	X	X	
186	Cancer of the testis	X	X	X	X	
189.0-189.2	Cancer of the kidney	X	X	X	X	
188, 189.3-189.4,	Cancer of the bladder and other urinary	X	X	X	X	
191-192	Cancer of the brain and other nervous system	X	X	X	X	
193	Cancer of the thyroid	X	X	X	X	
201	Hodgkin's disease	X	X	X	X	
200, 202	Non-Hodgkin's lymphoma	X	X	X	X	
203	Multiple myeloma	X	X	X	X	
204-208	Leukemia	X	X	X	X	
571	Cirrhosis of the liver	X	X	X	X	
E800-848	Road, rail, air (transport except boating)	X	X	X	X	
E830-838	Boating/ swimming	X	X	X	X	
E800-949	Possibly job related	X	X	X	X	
E950-959	Suicide including possible suicide	X	X	X	X	
E970-978	Assault	X	X	X	X	
E980-989	Other accidents	X	X	X	X	

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** indicates statistical significance at p<0.01

x = O<6