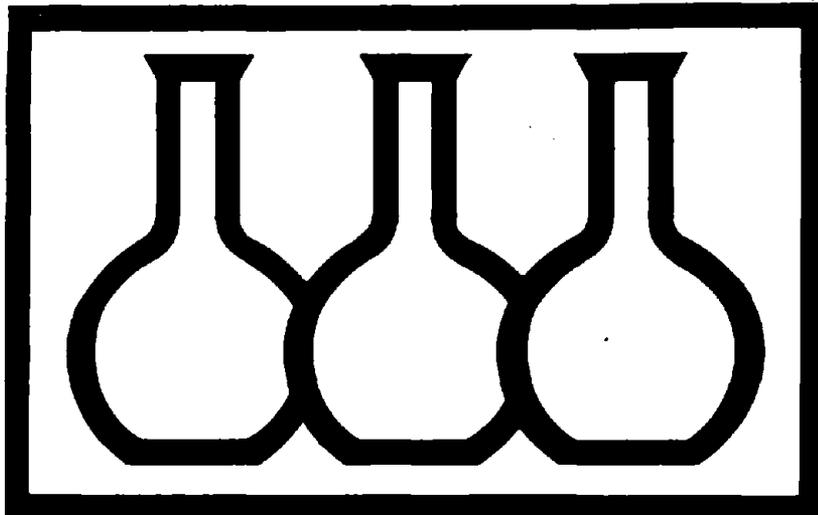


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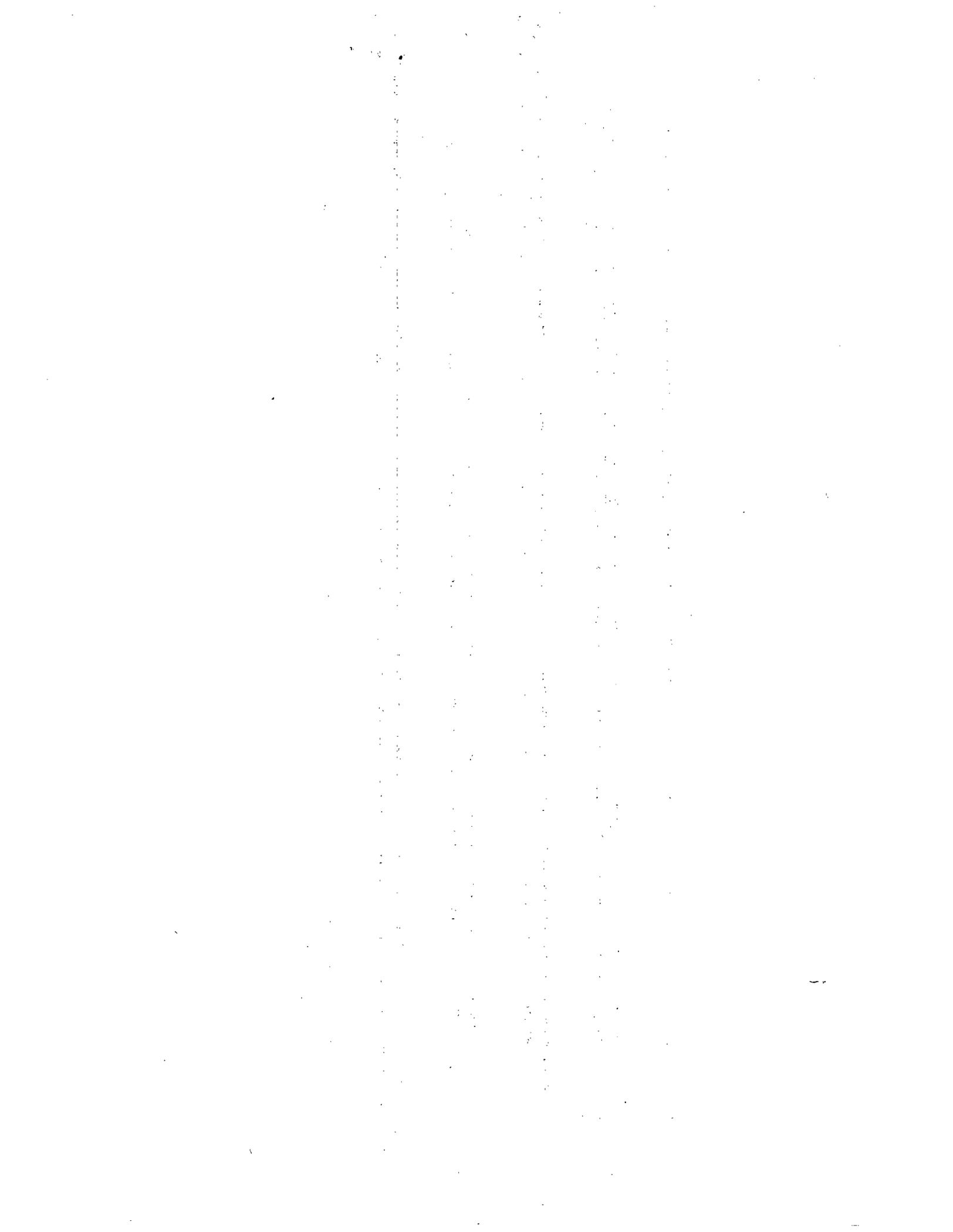


**NIOSH** RESEARCH REPORT

**VOLUME I**  
**OCCUPATIONAL**  
**MORTALITY IN**  
**WASHINGTON STATE**  
**1950 - 1971**

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**U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE**  
**PUBLIC HEALTH SERVICE / CENTER FOR DISEASE CONTROL**  
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VOLUME I

OCCUPATIONAL MORTALITY IN WASHINGTON STATE

1950-1971

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Contract No. CDC-99-74-26

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
Public Health Service  
Center for Disease Control  
National Institute for Occupational Safety and Health  
Division of Surveillance, Hazard Evaluations, and Field Studies  
Cincinnati, Ohio 45202  
April 1976



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Joseph Gustin

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## Preface

Surveillance of the mortality experience of employed populations is an important activity to those responsible for the investigation and elimination of occupational illness and injury. This study was performed to provide those so charged with an up-to-date reference on the mortality status of numerous occupational classifications. Epidemiologists and public health research personnel have used similar studies ("Registrar General's Decennial Supplement, England and Wales," and "Mortality by Occupation and Cause of Death, United States 1950") to assist in evaluating the causes of death predominant in a job category, but in recent years they have been left without "fresh" data.

The National Institute for Occupational Safety and Health was presented with an opportunity to support a statistical analysis of an existing set of death certificates already coded for occupation for white male resident deaths occurring in the State of Washington during 1950-1971. A study of this type would be of value regardless of the occupational diversity involved, but since the State of Washington provides an excellent cross-section of industries, the data will benefit a large segment of the occupational health community. The study also provides more detailed occupational classifications and cause of death categories than normally found in prior investigations of this type. Hence, this effort will help fill the gap created by a long standing dearth of surveillance data relative to mortality in employed populations.

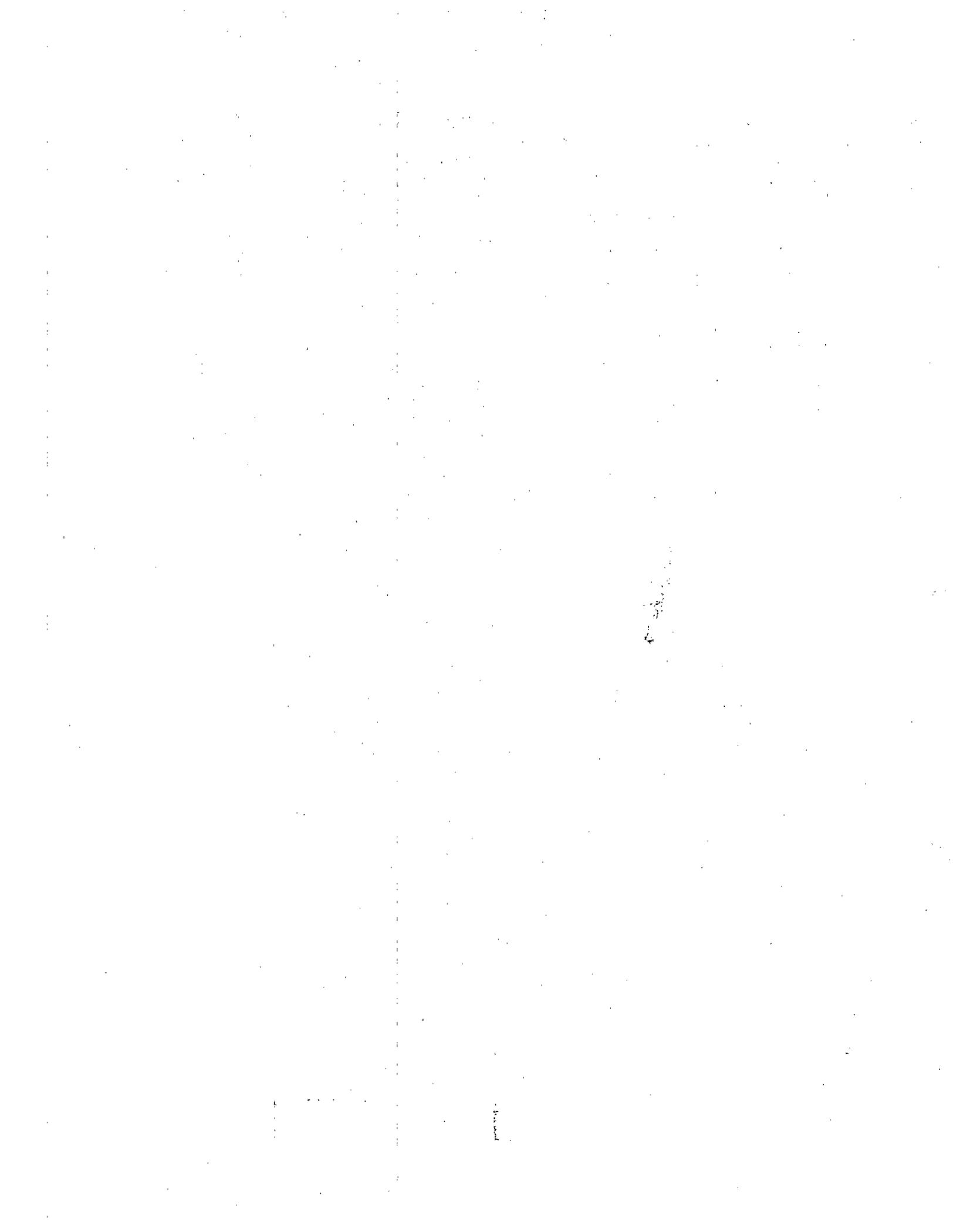


TABLE OF CONTENTS

Volume 1

Abstract. . . . . vii

Introduction. . . . . 1

Background. . . . . 2

Method. . . . . 3

Results . . . . . 4

Commentary. . . . . 5

Discussion. . . . . 43

Conclusion. . . . . 47

Acknowledgments . . . . . 48

References. . . . . 49

Occupational Cross Reference. . . . . 53

Exhibits:

    Exhibit 1--Death Certificate . . . . . 65

    Exhibit 2--PMR Calculation . . . . . 66

    Exhibit 3--Modified Occupation Code. . . . . 67

    Exhibit 4--Occupation Groupings. . . . . 76

Index to Occupations . . . . . 89

\*\*\*\*\*

Volume 2

Occupational Mortality Tables-----Occupation Numbers 000-434

Index to Occupations

\*\*\*\*\*

Volume 3

Occupational Mortality Tables-----Occupation Numbers 435-999

Index to Occupations

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1

## ABSTRACT

The occupational and cause-of-death information on about 300,000 Washington State male (age 20+) death records for the years 1950-1971 was analyzed using an age and year of death standardized proportionate mortality ratio approach. A detailed cause of death analysis (160 causes) is published for each of 194 occupational classes. The occupational mortality findings are compared with those of the Registrar General, for England and Wales (1,2), and with the one 1950 U.S. study(3).

In general, the Washington State mortality pattern is consistent with the published occupational mortality literature, but new occupational mortality associations are present which warrant follow up.

1. The Registrar General's Decennial Supplement, England and Wales, 1951, Occupational Mortality, Part II, Vol. 2, Tables. London, Her Majesty's Stationery Office, 1957.
2. The Registrar General's Decennial Supplement, England and Wales, 1961, Occupational Mortality Tables. London, Her Majesty's Stationery Office, 1971.
3. Guralnick, L. Mortality by Occupation and Cause of Death among Men 20-64 Years of Age: U.S. 1950. Vital Statistics, Special Reports, Vol. 53, No. 3, 1963.

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## INTRODUCTION

This study had its beginnings in a case-control study(1) of Hodgkin's disease which used the upstate New York death record file for occupational and cause-of-death information. The study showed an excess of woodworking occupations in the Hodgkin's disease group as compared to matched controls. When an interview study(2) and a population-based study(3) confirmed this finding, I decided to examine the occupational pattern in other selected cause of death groupings. An unpublished case-control study of male bladder cancer death certificates in Washington State was able to identify the same occupations with increased risk as previous clinical and interview studies(4-7). Also, a study(8) of leukemia death certificates in Washington State and Oregon was able to confirm and extend a previously reported(9) association of leukemia with farming occupations.

The accuracy and completeness of the death certificate occupational statement on the Washington State death certificate was seen to be quite good. The occupational item on the death certificate asks for "Usual occupation during most of lifetime" (See exhibit 1). Over 97% of adult male death certificates contained a usable occupation statement. The female death record occupational statement and the male record industrial statement were too poorly reported for use.

The accuracy of death certificate occupational statements was examined for three different cancers:

- a. For men dying of Hodgkin's disease(2) and urinary bladder cancer(10), interviews with next of kin indicated that the death certificate occupational statement was correct in 75% of the cases, and gave a related occupation in another 10% of the cases.
- b. In a study of community arsenic exposure due to a copper smelter (11), death certificates alone were able to identify 24 of 25 smelter workers dying of bronchogenic carcinoma ascertained through smelter records.

With this experience and confidence in the occupational information on the Washington State death record, I thought it appropriate to examine the mortality pattern for all occupational groups. The rationale behind this approach was that new occupational-cause of death associations would be revealed and could be followed up in cohort studies. The great appeal of identifying specific occupational causes of mortality is that, technically, all are preventable by environmental manipulation.

## BACKGROUND

This study has as its model two other vital record occupational mortality studies. The Registrar General (12,13) produces occupational mortality tables based on deaths occurring around census years. The other model was a study of 1950 U.S. deaths in men age 20-64(14). Both studies used the standardized mortality ratio (SMR) approach. Since there are no available denominator data for use in this study, I decided to use an age standardized proportionate mortality ratio (PMR) analysis. Exhibit 2 shows the PMR calculation.

The major flaw of the PMR is that it says nothing about total force of mortality for a given occupation. (All occupations have a total PMR of 100.) Also, since the cause of death specific PMRs must sum to 100, a very high or low PMR in a common cause of death group will affect the other PMRs for that occupation. Although the method has had numerous critics, I know of no body of data which has been able to discredit the PMR method by systematic comparison with denominator-based statistics. In one case in which such testing was done(15), the PMR seemed to accurately reflect the mortality pattern derived using a population-based statistic (SMR).

It is also comforting that all the intuitive or well-known occupational mortality associations show up in this study; electricians are electrocuted, airplane pilots die in plane crashes, loggers are struck by falling objects, etc.

The associations between cause of death and occupation seen in this study are statistical associations. Some will, of course, be chance associations, but many will be real. These associations are clues or starting points for more definitive studies. The major contention of this study is that epidemiologically useful information is contained in the death certificate occupational and cause of death statements.

## METHOD

Punch cards containing death record information were available for the years 1950-1971. Death certificate numbers of all male resident deaths in Washington State, age 20+ for the years 1950-1971, were listed in certificate number order within year of death. The death record occupational statements were abstracted and coded using a modification of the U.S. Census Bureau code (Exhibit 3). The death certificate numbers and the occupational codes were keypunched into a deck of cards, and these cards were then matched to the original death cards on year and death certificate number. For matching cards, the occupational code was punched into the initial death card. Non-matches were resolved clerically. The completed cards were read onto magnetic tape.

Since the study period included an International Classification of Diseases code change, eighth revision codes were translated to seventh revision codes with a translation table. The causes of death given in this study are according to the seventh revision ICD codes.

Since non-white deaths made up less than 3% of the total file, they were omitted from the basic tables of this study, for the sake of racial homogeneity. All tables presented are for white male deaths only.

A computer program, which performed an age and year of death standardized PMR analysis, was written and run. For each occupation, observed and expected deaths and a PMR are presented by detailed cause of death, grouped years of death, and age. Expected deaths are generated for each year of the study based on that year's mortality experience. Expectations are then summed over years of death into the appropriate cells of the table. Expected deaths are therefore specific for five-year age classes as well as year of death.

Expected death frequencies are rounded to the nearest whole number before printing. However, exact fractional expected frequencies are totaled into grouped years and grouped ages, so that these totals may be slightly different than the sum of the expected frequencies by five-year age classes. An "R" is printed for PMR values generated by division by an expected value less than one (to avoid meaninglessly large PMRs). An asterisk (\*) after a PMR value indicates that the observed and expected values for that PMR are significantly different at the 5% level ( $\chi^2_1 \geq 3.84$ ;  $P \leq .05$ ). PMRs are calculated using exact expected values. Statistical testing was done only on observed values of six or greater, and only in the grouped year of death columns. Cause of death lines are printed only if there is an observed or expected death.

The occupational code used in this study is a modification of the U.S. Census Bureau code(16). Codes were added to reflect occupations present in this state, and two groups of codes were modified to code industrial groupings rather than occupations: Hanford Works employees (atomic energy workers) and Boeing employees (a large aircraft manufacturing firm).

## RESULTS

The basic occupational mortality data of the study are found following page 87 in Volume 1 and in Volumes 2 and 3. The PMR tables are presented in occupational code number order (see Exhibit 3) and the commentary here is in the same order. The listing in Exhibit 4 indicates how individual occupations are grouped for analysis.

Basically, the commentary consists of a description of the mortality pattern seen in each of the occupational groupings, and compares this pattern to what has been published by the Registrar General(12,13) and by the one U.S. study(14) (the Guralnick Study) for the same occupational group. Frequently, comparison is impossible because of lack of occupational code comparability, or because of difference in cause of death groupings. An occupational cross reference table to these works is presented to assist the reader. Where other published work is applicable, it is cited. Occupational groups with less than 200 deaths are not described unless an interesting mortality pattern or known occupational hazard exists. A few groups with more than 200 deaths are not described, if the mortality pattern is not unusual, and no known occupational hazard exists. The commentary reflects the author's biases, and it is possible that different inferences may be drawn from the same data by others.

## COMMENTARY

Accountants, Auditors and Actuaries  
Occupation code 000  
Total deaths 2,649

Malignant neoplasms of the esophagus showed a PMR of 227 for the study period (observed 21 deaths, expected 9). Stomach neoplasms show a significantly lower PMR. Increased PMRs are seen in the lymphatic and hematopoietic cancers group, primarily due to an excess in the lymphosarcoma category and in the acute leukemia category (ICD 204.3) in spite of the fact that the grouped leukemias show no excess. The acute leukemia-lymphosarcoma excess is limited to deaths occurring since 1961.

Among the non-cancer causes of death, elevated PMRs are seen for diabetes mellitus and asthma in the 1950-60 time period, and for cerebral embolism and thrombosis, coronary heart disease, and bronchiectasis for the entire study period.

The 1961 Registrar General's tables for accountants do not show a similar mortality pattern, but diabetes has an increased SMR in the 1951 tables. Guralnick's 1950 tables for accountants and auditors corroborate the increases for leukemia, diabetes mellitus and coronary artery disease.

---

Airplane Pilots and Navigators  
Occupation code 012  
Total deaths 183

PMRs over 2,000 are seen for deaths due to aircraft accidents. Excess deaths are also seen for rectal cancer and leukemia. The Registrar General's tables (1961) show an SMR for other accidents (ICD 800-892) of 1,800.

---

Architects  
Occupation code 013  
Total deaths 260

No cause of death groups showed a statistically significant excess or deficit of deaths. However, the unspecified falls category (ICD 904) showed a PMR of 455. The Registrar General's 1951 and 1961 tables are not comparable because surveyors and others are included in the architect category. Guralnick's table for architects agrees in general with the pattern seen here, but the cause categories are not specific enough to corroborate the excess mortality from accidental falls.

---

Artists and Art Teachers  
Occupation code 014  
Total deaths 181

One cause (accidents, poisoning and violence; ICD 800-999) showed a

significant lowering of the PMR. Causes with PMRs over 200 are malignant neoplasms of the lymphatic and hematopoietic tissues, and cirrhosis of the liver. The Registrar General's data support the lymphatic-hematopoietic cancer increase, showing leukemia increases in both 1951 and 1961 in the category painters, sculptors, and engravers. Guralnick's data did not complete SMRs for these causes because of small sample size.

---

Chemists  
Occupation code 021  
Total deaths 172

PMRs over 200 were seen for cancer of the pancreas, leukemia, diabetes mellitus, cerebral embolism and thrombosis and suicide. The Registrar General's tables support the suicide excess, but not the diabetes or leukemia excess. No information is available on cancer of the pancreas. SMRs for these causes are not printed in Guralnick's tables.

A U.S. study(17) has suggested that chemists have increased mortality from cancer of the pancreas and malignant lymphoma, supporting the increased PMR for cancer of the pancreas found here.

---

Chiropractors  
Occupation code 022  
Total deaths 142

Cancers of the digestive organs (ICD 150-159) showed a statistically significant excess of deaths due to cancers of the rectum, stomach and esophagus.

---

Clergymen  
Occupation code 023  
Total deaths 1,450

Statistically significant excess deaths were seen in cancers of the brain, lymphatic and hematopoietic tissues, Hodgkin's disease, diabetes mellitus, diseases of the blood forming organs, coronary heart disease, hypertensive heart disease, pulmonary embolism and pneumonia. Significantly low PMRs were seen for cancer of the lung, emphysema without bronchitis, and cirrhosis of the liver, due probably to abstinence from tobacco and alcohol. A deficit is also seen in suicide (observed 4, expected 20) and in infective and parasitic diseases.

The Registrar General's data agree quite well with this mortality pattern as does a cohort study(18) of Lutheran ministers.

---

Professors and Instructors  
Occupation code 060  
Total deaths

Significant excess mortality was seen in stomach cancer in the years 1961-71, and in lymphatic and hematopoietic tissues cancer due mainly to an excess of reticulum-cell sarcoma. Cerebral embolism and thrombosis, paralysis agitans, chronic rheumatic heart disease and motor vehicle accidents in the years 1961-71 also showed excess deaths.

---

Dentists  
Occupation code 071  
Total deaths 734

Increased PMRs are seen for cancer of the pancreas (1961-71), cancer of the prostate (1950-60), and other diseases of the intestines and peritoneum (1950-60). The most striking PMR increase, however, is seen for suicide. The 1950 U.S. study and the Registrar General's tables both support the suicide excess. Other studies(19,20) have also reported a suicide excess in dentists.

---

Draftsmen  
Occupation code 074  
Total deaths 203

A significant excess is seen for diabetes mellitus, diseases of the respiratory system in 1950-60, and suicide in 1961-71. Motor vehicle accidents show a significantly low PMR.

---

Editors and Reporters  
Occupation code 075  
Total deaths 233

No statistically significant excesses or deficits are seen, but cancer of the large bowel shows a PMR of 203 based on 7 deaths, and men age 20-64 show a PMR of 199 for vascular lesions affecting the central nervous system based on 9 deaths.

---

Newspaper Owners, Publishers and Managers  
Occupation code 076  
Total deaths 285

Significant excess deaths were seen for carcinoma of lung, other vascular lesions of the central nervous system, and cirrhosis of the liver.

---

Civil Engineers  
Occupation code 082  
Total deaths 901

Increased PMRs are seen for cancer of the biliary passages and liver, cancer of kidney, cerebral embolism and thrombosis (1961-71), paralysis agitans, and pulmonary emphysema.

---

Electrical Engineers  
Occupation code 083  
Total deaths 487

Men in this group show excess mortality from asthma and lymphosarcoma.

---

Mechanical Engineers  
Occupation code 085  
Total deaths 288

Infective and parasitic diseases (especially respiratory tuberculosis) show elevated PMRs based on few deaths (observed 4 respiratory tuberculosis deaths, expected 1).

---

Engineers NEC  
Occupation code 093  
Total deaths 5,955

Significant PMR excesses are seen for ICD 144, cancer of other parts of the mouth (1950-60), cancer of hypopharynx, cancer of the large intestine and cancer of the liver (ICD 156). Cancer of the brain and thyroid gland, lymphosarcoma, acute leukemia, subarachnoid hemorrhage, paralysis agitans, amyotrophic lateral sclerosis, duodenal ulcer and aircraft accidents also show increased PMRs. The Registrar General's and Guralnick's tables do not show close agreement with this mortality pattern. This group, however, is heterogeneous, encompassing different engineering trades, so comparability may be poor.

---

Foresters and Conservationists  
Occupation code 103  
Total deaths 134

This group shows an elevation of PMRs for malignant neoplasms. For men age 20-64, there were 20 cancer deaths while only 10.4 were expected. Increased cancer PMRs were seen for digestive organs and peritoneum, due especially to cancers of the rectum and pancreas. Although based on small numbers, there appear to be mortality increases in cancers of the nose and accessory sinuses, respiratory cancer, multiple myeloma, asthma and bronchitis with emphysema, and ulcerative colitis.

---

Funeral Directors and Embalmers  
Occupation code 104  
Total deaths 222

PMR increases based on small numbers are seen for leukemia and aleukemia and cerebral embolism and thrombosis (1961-71).

---

Lawyers and Judges  
Occupation code 105  
Total deaths 1,217

Significant PMR elevations are seen for large intestinal cancers. At age 20-64, the PMR is 327 for this cancer. Excesses are also seen for brain cancer, myelogenous leukemia, diabetes mellitus, and other vascular lesions of the central nervous system (ICD 334). Excess deaths are seen for ulcer of stomach, hyperplasia of prostate and suicide (1950-60) in men age 20-64. The 1950 U.S. study supports the colon cancer excess. The Registrar General's tables support the leukemia excess (1961) and the suicide excess.

---

Musicians and Music Teachers  
Occupation code 120  
Total deaths 550

Significant PMR increases are seen for diseases of the arteries, fatal duodenal ulcer and cirrhosis of the liver (1950-60). A PMR over 300 is seen for Hodgkin's disease, supporting the increase seen in school teachers. Many music teachers are employed in schools. An excess of aplastic anemia (non-significant) is also seen. The 1950 U.S. study supports the cirrhosis excess. No direct comparison is possible with the Registrar General's tables.

---

Optometrists  
Occupation code 152  
Total deaths 132

Cancer of the prostate shows an increased PMR in this group.

---

Pharmacists and Druggists  
Occupation code 160  
Total deaths 871

This group shows an excess of deaths due to cancers of the buccal cavity and pharynx (1961-71) and cancer of the urinary bladder (1950-60). Intestinal obstruction without hernia and diseases of the pancreas show PMR elevations.

---

Photographers  
Occupation code 161  
Total deaths

This group shows very low PMRs for colon cancer and elevated PMRs for rectal cancers (based on small numbers).

---

Physicians  
Occupation code 162  
Total deaths 1,119

Physicians show excess mortality from cancers of the large intestine and prostate, and from pulmonary embolism and suicide. Guralnick's tables agree with the bowel cancer and suicide excess, and the Registrar General's tables also support the suicide excess. Other studies support the suicide increase seen in physicians(20,21).

---

School Teachers  
Occupation code 184  
Total deaths 1,685

Although malignant neoplasms show a PMR of 91, all age groups under age 50 have elevated PMRs from cancer. Significant elevations of PMRs are seen for malignant melanoma of skin, Hodgkin's disease, and leukemia (1961-71). Benign neoplasms (fatal), vascular diseases of the nervous system, chronic rheumatic heart disease, arteriosclerotic heart disease, and coronary heart disease also show excess deaths. There is little parallel with the mortality patterns published by the Registrar General. The 1950 U.S. study also shows little agreement.

The Hodgkin's disease excess in school teachers is interesting in light of the reported excess in students(22).

---

Medical and Dental Technicians  
Occupation code 185  
Total deaths 198

Cirrhosis of the liver without mention of alcoholism shows an excess of deaths in this group.

---

Veterinarians  
Occupation code 194  
Total deaths 160

Excess deaths from cancers of the large intestine and suicides are seen in this group.

---

Students  
Occupation code 196  
Total deaths 646

Students show an increased PMR for malignant neoplasms, with significant excesses for tumors of testis, brain, bone, Hodgkin's disease, and leukemia (1961-71). Diabetes Mellitus, inflammatory diseases of the central nervous system, and accidental falls also show excess deaths.

In light of the Hodgkin's disease excess seen in teachers and musicians and music teachers, the excess seen in students is consistent with Vianna's (22) observations and with the hypothesis that person to person spread occurs in Hodgkin's disease.

---

Farmers (Owners and tenants)  
Occupation code 200  
Total deaths 25,280

This category contains general farmers, truck farmers and farmers, nothing else stated. With the huge sample size, many causes show statistically significant excesses and deficits with only slightly elevated or depressed PMRs. PMRs over 150 are seen for cancers of the lip, liver in men age 20-64, connective tissue, multiple myeloma 1950-60, and lymphatic leukemia.

Amyotrophic lateral sclerosis shows a PMR of 172 in 1961-71 deaths. Accidental deaths caused by machinery have a PMR of nearly 600, and deaths due to electrocution also showed a PMR increase.

The lip cancer excess is probably due to increased exposure to sunlight. The leukemia excess has been noted previously(8,9).

The Registrar General's tables and the U.S. 1950 data support the leukemia excess and the accidental death excess.

---

Orchardists  
Occupation code 201  
Total deaths 2,251

The pattern of mortality of orchardists differs from that of the general farmers (code 200) in a couple of interesting ways. The farmers have significant deficits in both lung and large intestinal cancers, while the orchardists have significant excesses of both. However, the large bowel cancer excess in the orchardists was limited to the year 1950-60, and the lung cancer excess was greatest in the years 1961-71, with men age 20-64 having relatively higher PMRs. Diseases of the blood and blood-forming organs showed an elevated PMR in 1950-60 due primarily to pernicious anemia. Cerebral embolism and thrombosis was high in 1961-71. Motor vehicle accidents, accidents caused by machinery, and suicide in the period 1961-71 also showed excesses. Most orchardists in this state gave residences east of the Cascade Mountains with localization primarily in Chelan, Okanogan, and Yakima counties.

This area saw very heavy use of lead arsenate as an insecticide until 1940, and heavy use of DDT and other insecticides in the years since. Arsenic exposure has been linked with lung cancer elsewhere(23,24) and lead arsenate exposure must be considered among the etiologic hypotheses to explain the respiratory cancer increase seen in orchardists, especially since other farmers show a deficit of this cause.

---

Nurserymen  
Occupation code 202  
Total deaths 337

Nurserymen show a significant increase in cancer of the pancreas, and resemble the orchardists in having a lung cancer excess.

---

Ranchers (Cattle, Sheep, etc.)  
Occupation code 203  
Total deaths 2,768

Cattle ranchers show a significant excess of cancers of the prostate, kidney, and brain and nervous system. Lymphatic and acute leukemias show elevated PMRs, especially in men age 20-64 at death. Diabetes mellitus showed an excess in 1950-60 and in men age 20-64 for the entire study period.

The rest of the mortality pattern is similar to that of the general farmers (occupation code 200).

---

Dairy Farmers  
Occupation code 204  
Total deaths 1,814

This category shows significant excess of cancer of the stomach, brain and nervous system. Chronic rheumatic heart disease, coronary heart disease 1961-71, and other diseases of the heart also show excesses. Machinery accidents are increased as in the general farmers.

---

Wheat and Grain Farmers  
Occupation code 205  
Total deaths 3,347

These farmers are located almost exclusively in eastern Washington. They show an excess of kidney cancer (1961-71), and leukemia, with the leukemia PMR being highest in men age 20-64. Diabetes mellitus showed an excess in 1950-60. Chronic enteritis, ulcerative colitis and diseases of the genitourinary system show excesses. Automobile, airplane and machinery accidents all show excesses.

---

Poultry Farmers  
Occupation code 206  
Total deaths 582

These men show PMR elevations for cancers of the brain and nervous system, and for leukemia. The leukemia PMR for men age 20-64 is 585 based on 7 leukemias: 3 lymphatic, 3 acute and 1 unspecified leukemia. This excess has been reported previously(8).

---

Florists  
Occupation code 249  
Total deaths 258

Diseases of the arteries and emphysema without bronchitis show PMR elevations based on small numbers.

---

Store Buyers and Department Heads  
Occupation code 250  
Total deaths 244

Men in this group show an excess mortality from leukemia and arteriosclerotic heart disease including coronary disease, 1961-71.

---

Buyers and Shippers of Farm Products, Produce Brokers  
Occupation code 251  
Total deaths 598

Men in this group show an increased mortality from cancer of the pancreas and cerebral embolism and thrombosis.

---

Railroad Conductors  
Occupation code 252  
Total deaths 855

Increased PMRs are seen for malignant neoplasms of buccal cavity and pharynx, larynx, bronchus and lung, prostate (1961-71) and kidney. Railway accidents, as would be expected, also showed a mortality excess. Locomotive engineers and firemen show elevated PMRs for cancer of the large bowel while conductors show no increase for this cause.

---

Credit Men  
Occupation code 253  
Total deaths 220

Although no significant PMR increases are seen in this group, PMRs over 250 are seen for cancer of rectum, lymphosarcoma, brain cancer, and cirrhosis of the liver.

---

Civil Service Employees  
Occupation code 255  
Total deaths 1,853

This occupationally heterogeneous group shows an elevated PMR for cancer of pancreas, appendicitis, and gastric and duodenal ulcer (1961-71).

---

Officials and Administrators NEC, Public Administrators  
Occupation code 270  
Total deaths 606

Malignant neoplasms (grouped) show a PMR increase. Cancer of the rectum shows an increased PMR with men age 20-64 at death having a PMR of 471. Cancer of the pancreas and arteriosclerotic heart disease including coronary disease show increased PMRs. The 1950 U.S. study doesn't show this increase.

---

Officials; Lodge, Society, Union  
Occupation code 275  
Total deaths 480

Men in this group show an increased PMR for lymphatic and hematopoietic tissue cancers, especially myelogenous leukemia. Most of the men in this class were labor union officials who rose to leadership positions after years of rank and file membership and exposure to environmental agents characteristic of their trades.

---

Postmasters  
Occupation code 280  
Total deaths 311

Men in this group have increased PMRs for arteriosclerotic heart disease, but do not show the pattern of mortality seen in postal clerks and mailmen.

---

Purchasing Agents and Buyers NEC, Sales Managers  
Occupation code 285  
Total deaths 600

This group shows increased PMRs for cancers of the large intestine and urinary bladder, and for coronary heart disease.

---

Lumber Sales  
Occupation code 292  
Total deaths 888

Lumber salesmen and lumber yard owners show significant excess of large intestinal cancers in men age 20-64, and of brain cancer. Cerebral hemorrhage, other vascular lesions of the central nervous system, and paralysis agitans also show significant PMR elevations.

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Furniture Store Owners, Managers and Clerks  
Occupation code 297  
Total deaths 487

PMRs show increases for cancer of the pancreas, cancer of the lung (unspecified whether primary or secondary), chronic rheumatic heart disease and suicide (1961-71).

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Grocers, Grocery Clerks  
Occupation code 298  
Total deaths 3,081

Bone cancer and homicide show PMR elevations. The homicide increase is limited to the period 1961-71 and reflects fatal assault in connection with robbery.

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Bankers, Bank Clerks, Managers  
Occupation code 305  
Total deaths 941

Increased PMRs are seen in this group for malignant neoplasms, cancer of the large intestine, brain, and leukemia, especially lymphatic leukemia. Most of the PMR increase for the leukemias was confined to the 1950-60 time period. The cancer and leukemia excess is not reflected in the Registrar General's 1951 tables.

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Bookkeepers, Cashiers and Payroll Clerks  
Occupation code 310  
Total deaths 969

Men in this group show an excess of tumors of the buccal cavity and pharynx, especially tongue, and an excess of tumors of the urinary bladder. Increased bladder cancer has been reported in clerical workers by Cole, et al(4). Lymphosarcoma, pulmonary embolism and infarction, and intestinal obstruction without hernia show significant PMR increases. The 1950 U.S. study and the Registrar General's tables show SMR increases for chronic rheumatic heart disease. This study also shows that increase in the 1950-60 deaths.

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Vehicle Dispatchers and Starters, Traffic Managers  
Occupation code 314  
Total deaths 508

Coronary heart disease shows an increased PMR, while accidents, poisonings and violence show decreased PMRs. Although based on small numbers and not statistically significant, cancer of the pancreas and lymphosarcoma show PMR increases. The 1961 Registrar General's tables also show a coronary disease increase for traffic controllers and dispatchers.

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Mail Carriers  
Occupation code 323  
Total deaths 880

Mail carriers show an increased PMR for bladder cancer (1950-60) and for lymphosarcoma. The bladder cancer increase is supported by Cole's study(4). Diseases of the pancreas show a PMR increase based on 5 cases observed to 1.4 expected. No remarkable parallel with the 1950 U.S. study or the Registrar General's tables is seen.

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Postal Clerks  
Occupation code 340  
Total deaths 835

Postal clerks show a kidney cancer increase, but do not show the bladder cancer increase seen in mail carriers. Like the mail carriers, they show a lymphosarcoma increase. They also show a coronary heart disease increase and an increase in hyperplasia of the prostate. Postmen and mail sorters show an elevated SMR for hyperplasia of the prostate in the 1961 Registrar General's tables. The 1950 U.S. study shows an increase for cancer of kidney and urinary bladder in the category "Other Clerical and Kindred Workers".

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Shipping and Receiving Clerks  
Occupation code 343  
Total deaths 607

Subarachnoid hemorrhage and duodenal ulcer show PMR increases. The PMR for fatal duodenal ulcer in men age 20-64 is 518.

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Stock Clerks and Storekeepers  
Occupation code 350  
Total deaths 644

This group shows increased PMRs for cancer of the stomach, large intestine (1961-71), and prostate (1961-71). Other hypertensive disease, coronary heart disease (1950-60) and cirrhosis of the liver also show increased PMRs. The Registrar General's 1951 and 1961 tables for storekeepers generally support this pattern.

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Telegraph Operators  
Occupation code 352  
Total deaths 382

No clear mortality excess is seen for the entire study period. With small numbers of deaths, elevated PMRs are seen for urinary bladder cancer, cancer of the large intestine and lymphatic-hematopoietic cancers. The comparable group in the Registrar General's material (telegraph and radio operators) does not show similar elevations.

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Ticket, Station and Express Agents  
Occupation code 354  
Total deaths 623

This group shows increased PMRs for cancer of the large intestine and other and unspecified sites. Hypertensive heart disease and other hypertensive disease show PMR elevations. In the Registrar General's 1951 tables, ticket collectors and examiners also show an SMR elevation for hypertension.

---

Public Utility Workers  
Occupation code 363  
Total deaths 1,554

Men in this group worked primarily for Seattle City Light, Tacoma City Light, etc. and for Public Utility districts. Cancer of the rectum shows a PMR elevation (1961-71) as does asthma and coronary heart disease. Accidental deaths from electrocution (ICD 914) has a PMR of 449 which is consistent with increased exposure to electricity, as in the electricians group.

---

Clerical and Kindred Workers, NEC  
Occupation code 370  
Total deaths 989

This is the residual clerical group. PMR elevations are seen for cancers of the buccal cavity and rectum, and for Hodgkin's disease. Pulmonary emphysema also shows a PMR increase. The U.S. and British tables for clerical workers show no striking parallel in mortality pattern.

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Travelling Salesmen and Sales Representatives  
Occupation code 380  
Total deaths 3,441

Men in this group show increased deaths from cancers of the buccal cavity and pharynx, cancer of the liver (primary), cancer of the kidney (1950-60) and cancer of the urinary bladder (1961-71). Cancer of the brain and Hodgkin's disease show increases for 1950-60 but not later. Neoplasms of an unspecified nature, diabetes mellitus, diseases of arteries (1961-71) and chronic enteritis also show PMR increases. Diabetes shows a SMR increase in the 1950 U.S. study for sales clerks, and an increased SMR in the 1951 British tables for sales clerks, and an increased SMR in the 1951 British tables for commercial travellers and canvassers.

---

Insurance Agents, Underwriters, Appraisers  
Occupation code 385  
Total deaths 1,786

Men in this group show elevated PMRs for cancers of esophagus, pancreas (1950-60), prostate and bone. Multiple sclerosis has a PMR of 409 based on 9 deaths. Chronic rheumatic heart disease, coronary heart disease, other hypertensive disease (1950-60), accidental falls on the same level, and

suicide (1961-71) also show mortality increases. The 1950 U.S. study also supports the increased cardiovascular disease mortality and has a similar excess of lymphosarcoma although statistical significance is not achieved in the Washington State data for this cause.

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Car Salesman  
Occupation code 386  
Total deaths 1,191

Cancer of the rectum, coronary heart disease and suicide show elevated PMRs. This pattern is similar to that seen for sales clerks in the 1950 U.S. study.

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Newsboys  
Occupation code 390  
Total deaths 147

These men show excess deaths from infective and parasitic diseases especially tuberculosis. They also show excess mortality from cancer of the stomach, hypertensive heart disease, and motor vehicle accidents. The Registrar General's tables support the tuberculosis increase.

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Real Estate Agents, Brokers and Developers, Appraisers  
Occupation code 393  
Total deaths 2,501

Cancers of the buccal cavity and pharynx show PMR increases. Lymphosarcoma, coronary heart disease, and suicide also show PMR increases. The 1950 U.S. study shows a similar pattern.

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Sales Clerks NEC  
Occupation code 396  
Total deaths 3,539

This is a miscellaneous sales clerk category. Tumors of the buccal cavity and pharynx, larynx, bronchus and lung (1950-60), acute leukemias, and neoplasms of an unspecified nature show PMR increases. Chronic rheumatic heart disease and cirrhosis of the liver (1950-60) also have excess deaths. The 1950 U.S. study in general supports this mortality pattern.

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Bakers  
Occupation code 401  
Total deaths 1,001

Tumors of the buccal cavity and pharynx and large intestinal cancers show PMR excesses. Subarachnoid hemorrhage and accidental falls on the same level also show excess mortality. The 1950 U.S. study and the Registrar General's tables do not show similar mortality patterns.

---

Blacksmiths  
Occupation code 402  
Total deaths 1,130

Blacksmiths show elevated PMRs for cancer of the esophagus, other diseases of the heart, and other hypertensive disease. The Registrar General's tables show elevated SMRs for hypertension.

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Boilermakers  
Occupation code 403  
Total deaths 1,164

Men in this class show elevated PMRs for respiratory tuberculosis, cancers of the bronchus and lung, and urinary bladder (1961-71). Disorders of character, behavior and intelligence, pulmonary emphysema, and falls from one level to another also show PMR elevations.

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Brickmasons, Stonemasons, Tile Setters  
Occupation code 405  
Total deaths 1,141

Excess deaths are seen for tuberculosis, cancers of the stomach, bronchus and lung, and bone. Deaths due to avitaminosis and metabolic disease were increased, as well as deaths due to chronic nephritis and accidental falls from one level to another. The analogous U.S. and British groups show SMR increases for tuberculosis, stomach and lung cancer.

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Building Contractors, Construction Contractors  
Occupation code 406  
Total deaths 2,936

Cancer of the stomach, lymphosarcoma, and multiple myeloma show excess mortality. Accidental deaths due to falls from one level to another, death caused by machinery and electric current also show excesses. British statistics support the stomach cancer and accidental death excesses.

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Boatbuilders  
Occupation code 407  
Total deaths 271

These men are builders of small boats, usually of wood as opposed to men who work in shipyards. Excess mortality is seen for cancer of the stomach, as in the carpenters group.

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Carpenters  
Occupation code 411  
Total deaths 13,510

Carpenters show an excess of stomach cancers, cancers of the floor of the mouth, malignant melanoma of skin, Hodgkin's disease, pulmonary emphysema, accidental falls from ladders and from one level to another. The following causes of death showed significant excesses in men age 20-64 at death: cancers of kidney and bone; nephritis and nephrosis and chronic nephritis.

The Hodgkin's disease excess is present in New York State data(1). A study of the AFL-CIO, United Brotherhood of Carpenters and Joiners of America(3) supports the stomach cancer, Hodgkin's disease and accidental death excesses. The 1961 Registrar General's tables support the nephritis-nephrosis excess.

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Canvas Makers, Sailmakers, Awning Sales and Service  
Occupation code 412  
Total deaths 179

Elevated PMRs are seen for chronic rheumatic heart disease and other vascular lesions of the central nervous system.

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Cement and Concrete Finishers  
Occupation code 413  
Total deaths 853

Excess mortality is seen in the categories other hypertensive disease and accidental falls. Homicide also is increased as a cause of death.

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Cranemen, Derrickmen, and Hoistmen  
Occupation code 415  
Total deaths 529

Cerebral embolism and thrombosis, cancer of pancreas (age 20-64 at death) and accidental falls show excess mortality. Death due to electrocution was increased (1950-60) probably due to the contact of crane booms with high tension lines. The 1950 U.S. study and the British studies show accidental death increases.

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Oil Drillers, Well Drillers  
Occupation code 416  
Total deaths 266

Increased mortality from cerebral hemorrhage and pulmonary emphysema is seen. Accidental death due to blow from falling object and machinery accidents also show increased mortality.

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Electricians  
Occupation code 421  
Total deaths 3,190

Electricians show increased mortality from cancer of bronchus and lung (1950-60), cancer of the kidney (1950-60), cancer of the urinary bladder, cancer of the brain, and acute leukemia. Accidental deaths caused by electric current are increased. This pattern is supported by the U.S. and British studies.

The proportional registration ratios (PRRs) for malignant neoplasms published for the years 1966-7 by the Registrar General(25) show a remarkable parallel with the Washington State data for electricians: 5 of the 6 cancers with elevated PRRs in the British data also show elevated PMRs in the Washington State data. These causes are: neoplasm of the testis (PRR = 266, PMR = 134), malignant melanoma of skin (PRR = 225, PMR = 182), neoplasm of brain (PRR = 150, PMR = 157), neoplasm of connective tissue (PRR = 172, PMR = 144), Hodgkin's disease (PRR = 186, PMR = 151). The exposure of electricians to electric cable may explain the bladder cancer excess. Davies(26) has shown that electric cable workers have an increased incidence of bladder cancer due to carcinogenic substances present in electric cable coatings.

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Excavating, Grading, Paving, Highway Maintenance  
Occupation code 425  
Total deaths 618

Cancers of the bronchus and lung (1961-71) show increased PMRs. Motor vehicle accidents, blows from falling objects and machinery accidents all show increased PMRs. The 1951 Registrar General's tables show an increased SMR for lung cancer in pavers, street masons and asphalters.

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Glaziers  
Occupation code 434  
Total deaths 174

Although this is a small group, it has an interesting mortality pattern. Cancer of the rectum has a PMR of 429 based on 5 deaths observed to 1.1 expected. Four of the 5 deaths were in men under age 65. Alcoholic cirrhosis of the liver shows a similar increase. In the 1951 Registrar General's report glaziers show elevated SMRs for total cancers, cancer of the stomach and lung. The Washington State data fail to show the lung cancer excess, but are otherwise quite similar.

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Smelter Workers and Forgemmen  
Occupation code 435  
Total deaths 1,152

Most of the smelter workers were employed by a large copper smelter in Tacoma, Washington. Cancer of the bronchus and lung, showed elevated PMRs. Both British studies show a lung cancer increase for furnacemen. The lung

cancer increase in the Washington State data supports the respiratory cancer increase reported in smelter workers by Lee and Fraumeni(24). Applying U.S. white male mortality rates to the published population at risk(27), at this smelter, yields a very similar expected number of respiratory cancer deaths to that derived by the PMR method(11).

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Inspectors, Scalers, Graders; Log and Lumber  
Occupation code 444  
Total deaths 768

Only senility and ill-defined diseases showed a PMR increase for the entire study period.

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Jewelers, Watchmakers; Gold-, Silver- and Locksmiths  
Occupation code 451  
Total deaths 703

Men in this group show an increased mortality from chronic rheumatic heart disease and from accidental falls on the same level. The Registrar General's tables also pick out the chronic rheumatic heart disease excess which may be related to selection into this group of men with physical impairment.

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Linemen and Servicemen; Telegraph, Telephone, Power  
Occupation code 453  
Total deaths 1,111

The most striking facet (even though expected) is the large excess of deaths due to electrocution seen in this group (62 deaths observed, 2 deaths expected). The 1950 U.S. study and the 1961 Registrar General's tables also show an accidental death increase. Accidental falls from one level to another show a sizable excess mortality (observe 22, expect 5) which is consistent with the fact that these men spend a lot of time at the top of power and telephone poles. Other causes with significant increases in this group are: cancers of buccal cavity and pharynx (1961-71), cancer of the large intestine, cancer of the pancreas (1961-71), cancer of the lung (especially 1950-60), asthma (1961-71), and pulmonary embolism and infarction. The 1950 U.S. study supports the bowel and lung cancer increases.

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Locomotive Engineers  
Occupation code 454  
Total deaths 1,535

Malignant neoplasms of the large intestine, bronchus and lung (1961-71), other diseases of the heart, hypertensive heart disease (1961-71), cirrhosis of the liver (1961-71) and railroad accidents showed elevated PMRs. Reticulum-cell sarcoma showed a PMR of 324 based on 4 deaths observed. The 1950 U.S. study supports the lung and bowel cancer and accidental death increases.

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Locomotive Firemen  
Occupation code 460  
Total deaths 272

Like locomotive engineers, mortality increases are seen for cancer of the large intestine and for railroad accidents. Cerebral embolism and thrombosis (1950-60) at age 20-64 also show a PMR increase. A small number increase is seen for multiple sclerosis.

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Manufacturing Workers, NEC  
Occupation code 462  
Total deaths 289

Cancers of the stomach and large intestine, especially 1950-60, show PMR increases.

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Machinists  
Occupation code 465  
Total deaths 4,284

An unremarkable pattern of mortality is seen for machinists.

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Railroad Workers, NEC  
Occupation code 469  
Total deaths 5,548

Infective and parasitic diseases, neoplasm of unspecified nature, disorders of character, behavior and intelligence, pneumonia, alcoholic cirrhosis of the liver, and railroad accidents show PMR increases. Men in this group are primarily railroad laborers and trackmen. They are of lower social class and have different environmental exposures than railroad conductors, locomotive engineers and firemen, so it is not surprising that their mortality patterns differ.

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Mechanics and Repairmen, Automobile  
Occupation code 472  
Total deaths 2,344

PMR increases are seen for cancers of the esophagus, bronchus and lung, urinary bladder, multiple sclerosis, hernia of the abdominal cavity, other diseases of the urinary system, motor vehicle accidents, and accidental falls on the same level. The lung cancer increase is supported by the 1950 U.S. and 1951 British study. The U.S. study also supports the accidental death increase.

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Mechanics and Repairmen, NEC  
Occupation code 480  
Total deaths 4,263

Like auto mechanics, men in this group show elevated PMRs for cancer of the esophagus, bronchus and lung. In addition, elevations are seen for cancers of the nose, middle ear and accessory sinuses, cancer of the brain, lymphosarcoma (1950-60), myeloid leukemia and neoplasm of unspecified nature. Asthma shows excess deaths (1950-60), with men under age 50 at death showing an elevated PMR. Cerebral embolism and thrombosis show a PMR elevation as do unspecified falls (1950-60). The 1950 U.S. study also shows a lung cancer excess.

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Millers; Grain, Flour, Feed  
Occupation code 490  
Total deaths 430

Millers show increased mortality from cancer of the rectum, cerebral hemorrhage (1961-71), chronic rheumatic heart disease and pulmonary emphysema (PMR = 402, age 20-64). Unspecified falls also show a mortality increase.

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Millwrights  
Occupation code 491  
Total deaths 958

Increased mortality is seen for Hodgkin's disease, chronic rheumatic heart disease, and accidental falls from one level to another. Elevated PMRs based on small numbers of deaths are also seen for lymphosarcoma and acute leukemia.

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Molders, Metal  
Occupation code 492  
Total deaths 410

Molders show a very similar pattern of mortality in the Washington State, U.S. and British data. Respiratory tuberculosis, cancer of the bronchus and lung (age 20-64), silicosis, and cirrhosis of the liver show increased mortality in the Washington State data. Respiratory tuberculosis and lung cancer show increased mortality in both the U.S. and British studies. The "occupational pneumoconiosis" rubric in the British studies, and the "other diseases of the respiratory system" rubric in the U.S. study show excess mortality consistent with the silicosis excess seen in the Washington State data.

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Motion Picture Projectionists  
Occupation code 493  
Total deaths 158

Cancer of the pancreas shows a PMR elevation.

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Paper and Pulp Mill Workers  
Occupation code 500  
Total deaths 2,077

Men in this group show a very interesting pattern of mortality. Cancers of the small intestine and cancers of the lymphatic and hematopoietic tissues show excess deaths. Lymphosarcoma showed an excess in 1961-71, as did multiple myeloma. Hodgkin's disease showed a significantly elevated PMR and lymphatic and monocytic leukemia showed PMR elevations which did not achieve statistical significance at the 5 percent level. Diseases of the blood and blood-forming organs show an excess due primarily to fatal anemias.

Coronary heart disease shows a slight but significant PMR increase. Accidents caused by machinery also show an increased mortality.

It is possible that the excess of fatal anemias is related to the increased mortality from cancers of the lymphatic and hematopoietic tissues. Environmental agents which cause fatal anemias are good candidates for also being carcinogens of the lymphatic and hematologic tissues. Increased PRRs for Hodgkin's disease, multiple myeloma, and cancer of the small intestine are seen for paper and printing workers in the 1966-67 supplement on cancer published by the Registrar General(21). Paperworkers were in excess in a study of Hodgkin's disease deaths in New York State(1).

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Paperhangers and Decorators (Painters)  
Occupation code 501  
Total deaths 722

Lung cancer, urinary bladder cancer (1950-60) and ulcer of the stomach show PMR elevations.

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Plasterers and Lathers  
Occupation code 505  
Total deaths 549

Malignant neoplasms (1950-60) show a mortality excess due to cancer of the stomach, large intestine and pancreas. Multiple myeloma, asthma, and lung cancer show PMR elevations which do not reach statistical significance. The 1950 U.S. study and both British studies show an SMR elevation for all cancers and lung cancer. The 1951 British study also shows the stomach cancer excess.

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Shipyard Workers, Shipfitters  
Occupation code 507  
Total deaths 2,721

Men in this group show PMR increases for cancers of buccal cavity and pharynx (1950-60), other parts of the mouth (ICD 144), respiratory system, lymphosarcoma and reticulosarcoma (1950-60). Avitaminosis, metabolic diseases,

other vascular lesions of the central nervous system, other myocardial degeneration, other chronic interstitial pneumonia and other diseases of intestines and peritoneum also show PMR elevations.

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Plumbers and Pipefitters  
Occupation code 510  
Total deaths 3,087

Excess mortality is seen for malignant neoplasms (grouped). There were 5 deaths due to tumors of the salivary gland with 1.4 expected. Tumors of the liver, bronchus and lung, testis, and urinary bladder (1950-60), connective tissue, and other lymphomas also showed excess deaths. Pulmonary emphysema, infections of the kidney, unspecified falls (1961-71) and accidental death caused by fire and explosion had statistically significant elevations of PMR. The 1950 U.S. study and both Registrar General's reports show a lung cancer excess for plumbers.

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Pressmen and Plate Printers, Printing  
Occupation code 512  
Total deaths 1,283

Grouped malignant neoplasms show excess deaths. Malignant neoplasms of esophagus, large intestine, rectum, bronchus and lung (1950-60), and kidney contributed to this excess. Other myocardial degeneration (1961-71), cirrhosis of the liver and accidental falls also had PMR excesses. The 1950 U.S. study and the 1961 Registrar General's report support the overall cancer and lung cancer increases. Cirrhosis shows SMR increases in both the British and U.S. data, based on small numbers and the 1961 British study shows an SMR increase for accidents.

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Roofers and Slaters  
Occupation code 514  
Total deaths 408

Men in this group show increased mortality from three different lung related causes of death: lung cancer, asthma, and pulmonary emphysema. All show PMR excesses, probably due to inhalation of hydrocarbons in the hot tar roofing operation. Asbestos is also present in some roofing materials. Alcoholic cirrhosis of the liver and accidental deaths due to falls also show excess deaths.

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Shoemakers and Repairers  
Occupation code 515  
Total deaths 772

Diabetes mellitus (1961-71), cerebral embolism and thrombosis (1961-71) and senility and ill-defined diseases (1950-60) show elevated PMRs.

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Stationary Engineers  
Occupation code 520  
Total deaths 1,489

Malignant neoplasms (grouped) show an increased PMR (1950-60). Cancers of the pancreas, bronchus and lung, leukemia (especially myeloid leukemia), coronary heart disease (1961-71), nephritis and nephrosis (1950-60) show PMR elevations. The 1950 U.S. study also showed a lung cancer increase. Lung cancer mortality does not show increases in the Registrar General's material.

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Stonecutters and Stonecarvers  
Occupation code 521  
Total deaths 141

Although only 141 deaths occurred in this group, 6 were ascribed to silicosis versus less than 1 expected. Pancreatic cancer showed a PMR of 359 based on 5 deaths. Tuberculosis of the respiratory system showed a mortality increase based on 4 deaths observed to less than 1 expected. The British data support the tuberculosis and the occupational pneumoconiosis (silicosis) excesses.

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Structural Metal Workers  
Occupation code 523  
Total deaths 1,315

Men in this group have excess deaths from carcinoma of the urinary bladder. This association has been reported previously(6). Cerebral embolism and thrombosis are also in excess. A very high PMR is seen for accidental falls from one level to another. This excess is supported by both the Registrar General's data and the 1950 U.S. study which show increased SMRs for accidental deaths.

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Tailors  
Occupation code 524  
Total deaths 573

Significant PMR increases are seen for hypertensive heart disease and hyperplasia of prostate. The 1951 British and 1950 U.S. studies support these increases. Nonsignificant PMR increases are seen for urinary bladder cancer and for intestinal obstruction without hernia. A bladder cancer increase in tailors has been reported(5) and the 1951 Registrar General's study shows an SMR of 175 for the intestinal obstruction rubric. The 1950 U.S. study shows a lung cancer and coronary artery disease increase which is not seen in the Washington State data.

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Tinsmiths, Coppersmiths and Sheet Metal Workers  
Occupation code 525  
Total deaths 1,423

Men in this category show PMR increases for cerebral embolism and thrombosis and accidental falls, as do the structural metal workers. PMR elevations are seen for cancers of the rectum, bronchus, trachea, lung and pancreas. The 1950 U.S. study supports the respiratory cancer excess.

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Aluminum Workers  
Occupation code 526  
Total deaths 583

Men in this group show an increase of total cancer. Cancer of the pancreas, respiratory system (1950-60) and malignant lymphomas show significant increases in deaths. Cancer of the testis, brain, and esophagus show non-significant increases based on a small number of deaths. Cancer of the pancreas and malignant lymphomas showed mortality increases in a study of the members of the American Chemists Society(17). Aluminum workers are exposed to coal tar pitch volatiles.

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Cannery and Food Processing Workers  
Occupation code 527  
Total deaths 801

Grouped malignant neoplasms show a slightly elevated PMR. Neoplasms of the digestive organs and peritoneum (grouped) show excess mortality due to neoplasms of the esophagus, large intestine, pancreas and peritoneum. Urinary bladder neoplasms, lymphosarcoma and acute pancreatitis also show elevated PMRs. Fatal ulcers of the stomach and duodenum show PMR elevations in men age 20-64. The 1961 British study supports the general cancer excess.

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Floor Covering Workers  
Occupation code 528  
Total deaths 181

With the small number of deaths in this group, only arteriosclerotic heart disease (1961-71), hypertensive heart disease, and other accidents (1950-60) show increased mortality.

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Tool and Die Makers and Setters  
Occupation code 530  
Total deaths 344

Men in this group show elevated PMRs for lung cancer and suicide. Arteriosclerotic heart disease, including coronary disease, also showed a slight mortality excess (1950-60).

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Upholsterers  
Occupation code 535  
Total deaths 289

Chronic rheumatic heart disease, arteriosclerotic heart disease in men age 20-64, and diseases of arteries (1950-60) show excess mortality. A non-significant PMR elevation is seen for urinary bladder cancer.

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Craftsmen and Kindred Workers  
Occupation code 545  
Total deaths 344

Cerebral hemorrhage (age 20-64), subarachnoid hemorrhage and cancer of the kidney show PMR elevations based on small numbers.

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Officers and Enlisted Men, Navy and Coast Guard  
Occupation code 551  
Total deaths 1,315

Officers and Enlisted Men; Air Force, Army and Marine Corps  
Occupation code 555  
Total deaths 2,590

PMRs are artificially elevated for a number of causes of death because of referral of ill armed servicemen to the large military medical centers in this state. Also, men retired for medical reasons are more likely to take up residence near the military medical facilities in the state. These populations have a high risk of dying and inflate the PMR for these two occupational classes.

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Boeing Workers  
Occupation code 557  
Total deaths 2,511

This is an industrial grouping of men employed by a large aircraft manufacturing firm in the Seattle area. These men show significant elevations of PMR for acute leukemia, other specified anemias (ICD 292), paralysis agitans (1961-71) and coronary heart disease. Other causes with non-significant increases in PMR are cancer of the pancreas and Hodgkin's disease.

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Atomic Energy Workers  
Occupation code 558  
Total deaths 727

This is the group of workers associated with the Atomic Energy Commission Hanford Project at Richland, Washington. The fact that twice as many deaths occurred in 1961-71 as 1950-60 is explained by the fact that the Hanford Project started in 1941 and the work force is now aging to the point where higher mortality rates prevail.

Cancer of the pancreas shows a significant PMR elevation in both time periods. Cancer of the large intestine shows an elevated PMR in men age 20-64. Examination of 1972 and 1973 deaths supports these findings and suggests that amyotrophic lateral sclerosis may also have an increased mortality in this industrial group.

In 1972 there were no pancreatic cancer deaths, 2 large intestinal cancer deaths (age 45-49) and 3 deaths due to amyotrophic lateral sclerosis. In 1973 there was 1 pancreatic cancer death (age 60-64), 1 large intestinal cancer (age 60-64), and no amyotrophic lateral sclerosis deaths.

Interestingly, the cancers associated with penetrating whole body radiation show no remarkable PMR excess. Leukemias show lowered PMRs; multiple myeloma shows a small PMR increase based on 4 deaths. It may be that the colon cancer excess in young men is related to inhalation and/or ingestion of radionuclides. On the basis of gastrointestinal transit times, colon is the predicted site of maximal exposure to ingested radionuclides. The pancreatic cancer excess and the amyotrophic lateral sclerosis excess have no obvious relationship to radiation exposure. The colon cancer excess is corroborated by a population based mortality study(28).

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Asbestos and Insulation Workers  
Occupation code 630  
Total deaths 136

Increased PMRs are seen for malignant neoplasms. Most of this excess is due to a very high PMR for respiratory cancers. Excess deaths are also seen in the category, diseases of the respiratory system, due primarily to asbestosis. A number of studies have reported this association(29).

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Attendants; Auto Service, Parking, Gas Station  
Occupation code 632  
Total deaths 3,144

Unspecified pharyngeal tumors showed a 5 to 1.4 excess in men age 20-64. Tumors of testis (1961-71), tumors of unspecified sites, asthma, diabetes mellitus, cerebral hemorrhage and coronary heart disease also show elevated PMRs. The diabetes excess in men under age 35 is 10 deaths observed to less than 3 expected. The 1950 U.S. study does not show a comparable pattern.

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Blasters and Powdermen  
Occupation code 634  
Total deaths 190

PMRs in the neighborhood of 600 are seen in the accidental death grouping (ICD 910-936) from work-related accidents

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Railroad Brakemen  
Occupation code 640  
Total deaths 1,049

Malignant neoplasms of buccal cavity and pharynx are the only tumors showing a statistically significant excess. Diseases of the arteries (age 20-64), pulmonary emphysema, railway accidents and unspecified falls also show excess deaths.

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Bus Drivers  
Occupation code 641  
Total deaths 824

Bus drivers show increased mortality from lung cancer, and non-significant elevations of PMR for myeloid and acute leukemias. Diseases of the blood and blood-forming organs (including aplastic anemia) also show PMR elevations. This excess may be related to the leukemia excess. Coronary heart disease and hypertensive heart disease, and other diseases of the intestine and peritoneum also show PMR excesses. The 1961 British study shows an SMR elevation for leukemia in bus drivers and an increased SMR for bronchitis. A non-significant PMR elevation is seen in the Washington data for chronic bronchitis with emphysema.

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Deliverymen and Routemen  
Occupation code 650  
Total deaths 479

Men in this class show increased mortality from malignant neoplasms of the digestive organs and peritoneum, due primarily to increased mortality from cancers of the esophagus, rectum and pancreas. Motor vehicle accidents, especially 1950-60 and in younger men, also show increased mortality.

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Creameryworker, ice cream and cheese makers, dairymen  
Occupation code 655  
Total deaths 639

Cancer of the kidney, diabetes mellitus, chronic rheumatic heart disease and motor vehicle accidents (1961-71) show excess deaths. The pattern of mortality seen in this class is remarkably similar to that seen in dairy farmers, for unusual causes of death (i.e. cancer of the brain, myeloid leukemia, chronic rheumatic heart disease, and chronic enteritis show PMR elevations in both groups). Misclassification of occupation is one possible explanation for the similarity, but both groups are exposed to raw milk, an excellent culture medium. Milk has been associated with outbreaks of both streptococcal and enteric diseases, which may explain the rheumatic and enteric disease excess.

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Milk Route Deliverymen  
Occupation code 656  
Total deaths 196

There is no significant PMR elevation in this class due primarily to the small number of deaths, but elevated PMRs are seen for stomach cancer and lymphosarcoma.

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Laundry and Dry Cleaning Operatives  
Occupation code 674  
Total deaths 858

Men in this group show increased mortality from respiratory tuberculosis (1950-60), malignant neoplasms of buccal cavity and pharynx, and large intestine. Cirrhosis of the liver also shows excess deaths. Acute pancreatitis, cancer of the larynx, and urinary bladder cancer show non-significant elevations of PMR. The 1950 U.S. study and the 1961 British study do not have parallel mortality patterns. The excess of buccal and laryngeal cancer, cirrhosis and pancreatitis may be related to exposure to organic solvents and is similar to disease usually associated with alcoholism. The bladder cancer excess may be explained by exposure to dyes.

---

Meatcutters and Butchers  
Occupation code 675  
Total deaths 2,039

In the 1950 U.S. study, meatcutters show an SMR of 258 for cirrhosis of the liver. Excess mortality in the Washington State data is seen primarily for those causes of death associated with alcoholism, i.e. cancers of the buccal cavity, pharynx and esophagus; avitaminosis; and cirrhosis of the liver (1950-60). Other causes with increased PMRs are inflammatory diseases of the central nervous system and infections of the kidney (1950-60).

---

Mine Operatives and Laborers  
Occupation code 685  
Total deaths 3,297

Respiratory tuberculosis showed 74 deaths to 14 expected (PMR 522) and silicosis showed 42 deaths to 1.6 expected (PMR 2,511). Other causes with elevated PMRs are: cancer of the pharynx (ICD 148), cancer of the stomach (1951-61), cancer of the respiratory system, other diseases of the heart, hypertensive heart disease (1961-71), pulmonary embolism and infarction (1950-60), pneumonia, chronic bronchitis, anthrosilicosis, other pneumoconiosis, chronic interstitial pneumonia, pulmonary emphysema, cirrhosis of the liver, and accidents (especially falls and blows from falling objects). The U.S. and British studies agree quite well with this mortality pattern as does most of the extensive literature on miner's mortality(30-32).

---

Oilers and Greasers, except auto  
Occupation code 692  
Total deaths 258

Men in this group show excess deaths from lung cancer, diseases of arteries and accidents, especially accidents involving machinery and electric current.

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Packers and Wrappers  
Occupation code 693  
Total deaths 140

The category, other diseases of the respiratory system, shows a mortality excess due to emphysema and bronchiectasis. Leukemia and diseases of the blood-forming organs show excess deaths based on small numbers.

---

Painters  
Occupation code 694  
Total deaths 3,755

Significant excess deaths are seen for respiratory cancer, diabetes mellitus (1961-71), duodenal and gastric ulcer, cirrhosis of the liver with alcoholism, cholelithiasis, acute pancreatitis (1950-60) and accidental falls, especially from ladders and from one level to another. The respiratory cancer excess is seen in the 1951 and 1961 British studies.

---

Sailors, Deck Hands, and Seamen, NEC  
Occupation code 703  
Total deaths 2,861

Excess mortality is seen for respiratory tuberculosis and for cancers of the esophagus, stomach, larynx, and lung. Other causes of death with increased PMRs are disorders of character, behavior and intelligence, hypertensive heart disease, pneumonia, alcoholic cirrhosis of the liver, acute pancreatitis, accidental falls, accidental deaths caused by fire and explosion, and deaths due to homicide.

---

Sawyers, Sawmill Workers and Sawfilers  
Occupation code 704  
Total deaths 2,385

Increased PMRs are seen for accidental deaths caused by machinery, accidents due to falling objects, and caused by fire and explosion. Suicide also shows an elevated PMR. PMRs over 200 (based on small numbers) are seen for cancers of the esophagus, testis, kidney and melanoma of skin. Intestinal obstruction without hernia, chronic enteritis, and senility and ill-defined diseases also showed excess mortality.

---

Plywood workers  
Occupation code 706  
Total deaths 1,494

Cancer of the stomach, respiratory cancer (1950-60) and cancers of the lymphatic and hematopoietic tissues show PMR increases. Multiple myeloma, myeloid and acute leukemia, but not lymphatic leukemia are responsible for the hematopoietic cancer excess. Coronary heart disease also shows a slight PMR elevation.

---

Taxicab Drivers and Chauffeurs  
Occupation code 714  
Total deaths 690

Cancer of the urinary bladder, diseases of the arteries, pulmonary emphysema, duodenal ulcer, and homicide show significant PMR elevations. The emphysema excess (15 deaths observed, 6 expected for age 20-64) is interesting in that it is not accompanied by a lung cancer excess. Other causes of death with PMR elevations are: cancer of the larynx, alcoholic cirrhosis of the liver, and acute pancreatitis. The 1950 U.S. study shows SMR elevations for lung cancer and arteriosclerotic heart disease which the Washington State data do not show. The rest of the mortality pattern is quite similar.

---

Truck and Tractor Drivers  
Occupation code 715  
Total deaths 5,478

Men in this group show PMR elevations for cancer of the larynx, cancer of the lung (unspecified whether primary or secondary), cancer of the urinary bladder, other myocardial degeneration, chronic bronchitis, acute pancreatitis, infections of the kidney, motor vehicle accidents and accidental deaths due to a blow from a falling object. The U.S. and British studies support the lung cancer and motor vehicle accident increases.

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Fuel Oil Truck Drivers  
Occupation code 716  
Total deaths 191

The mortality pattern in this group is, as expected, quite similar to that of other vehicle drivers. Although total deaths are too small to achieve statistical significance, PMR elevations are seen for cancer of the lung (unspecified whether primary or secondary), cancer of the urinary bladder, diseases of the arteries, chronic bronchitis, emphysema and motor vehicle accidents. All these causes were elevated in one of the other driver categories.

---

Welders and Flame Cutters  
Occupation code 721  
Total deaths 1,376

Men in this group show a lung cancer excess and increased mortality from cancers of other and unspecified sites. Bone cancer shows a PMR elevation (4 cases observed, 1.4 expected). Chronic bronchitis with emphysema, other pneumoconiosis, chronic interstitial pneumonia, cirrhosis of the liver with alcoholism, and accidental death due to fire and explosion also show excess deaths. The British studies (1951 and 1961) show similar mortality patterns.

---

Operatives and Kindred Workers, NEC  
Occupation code 722  
Total deaths 1,026

This is a residual, non-specific category. Excess mortality is seen for arteriosclerotic heart disease, diseases of the respiratory system (emphysema, 3 silicosis deaths) and cholecystitis without gall stones. The 1950 U.S. study parallels this pattern with the exception of a high SMR for work-related accidental deaths not seen in the Washington State data.

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Forest Service Workers, Game Department Workers  
Occupation code 724  
Total deaths 733

A generally unremarkable mortality pattern is seen. However, cancer of the prostate and accidents caused by machinery show PMR elevations.

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Ordnance Plant Workers  
Occupation code 726  
Total deaths 281

Excess deaths are seen from cerebral hemorrhage and motor vehicle accidents.

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Attendants, Hospital and Institution  
Occupation code 810  
Total deaths 372

Tuberculosis, especially of the respiratory system, shows a PMR increase. Chronic rheumatic heart disease, pulmonary emphysema, and suicide also show excess deaths. Each of these causes of death shows an SMR increase in the 1951 and 1961 Registrar General's tables.

---

Attendants, Recreation and Amusement  
Occupation code 813  
Total deaths 382

Respiratory tuberculosis, cancer of the urinary bladder, other myocardial degeneration and other diseases of the heart, and cirrhosis of the liver show PMR elevations. The 1961 British study shows a parallel mortality pattern.

---

Barbers  
Occupation code 814  
Total deaths 2,208

Cancer of the esophagus, multiple myeloma, asthma, psychosis, and suicide show increased mortality. The Washington State tables fail to show a tuberculosis increase. Otherwise, the 1950 U.S. study and both British studies show a similar mortality pattern.

---

Bartenders  
Occupation code 815  
Total deaths 1,942

Diseases associated with alcoholism show excess deaths. Cancers of the buccal cavity and pharynx, cancer of the larynx, diabetes mellitus, avitaminosis and metabolic diseases, emphysema, gastric and duodenal ulcer, cirrhosis of the liver and homicide show elevated PMRs. Good agreement with the U.S. and British studies is seen.

---

Restaurant and Cafe Owners  
Occupation code 817  
Total deaths 1,309

Cancers of the lung (unspecified primary or secondary), diabetes mellitus, other myocardial degeneration, and cirrhosis of the liver show excess deaths. The British studies show good agreement.

---

Brewery Workers  
Occupation code 818  
Total deaths 268

Men in this group show elevated PMRs for cancer of the stomach, primary liver cancer, cancer of the prostate, chronic rheumatic heart disease, and other myocardial degeneration. It is possible that the beer drinkers heart syndrome is responsible for the PMR increase in the myocardial degeneration rubric.

---

Hotel, Motel, Resort; Owners and Managers  
Occupation code 819  
Total deaths 2,187

Elevated PMRs are seen for tuberculosis (1950-60), multiple myeloma, cirrhosis of the liver, and acute pancreatitis. The 1951 British study shows a tuberculosis excess and both British studies showed a cirrhosis excess.

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Cooks and Candy Makers  
Occupation code 825  
Total deaths 3,525

Men in this group show increased mortality from respiratory tuberculosis, cancers of the buccal cavity and pharynx, esophagus, lung and urinary bladder. Other causes of death with increased mortality are deaths from avitaminosis and metabolic diseases, disorders of character, behavior and intelligence, chronic rheumatic heart disease, pneumonia, emphysema, gastric ulcers, chronic enteritis and ulcerative colitis, alcoholic cirrhosis of the liver, accidental falls, and accidental deaths caused by fire and explosion. The U.S. and British reports have a parallel mortality pattern. The urinary bladder cancer excess is supported by an interview study(4).

---

Dishwashers  
Occupation code 826  
Total deaths 193

The mortality pattern in dishwashers is similar to that of cooks. PMR elevations are seen for tuberculosis, diseases of the respiratory system (pneumonia and pulmonary emphysema), cirrhosis of the liver, and suicide. The 1961 British study shows a similar pattern.

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Window Cleaners and Wall Washers  
Occupation code 833  
Total deaths 95

As expected, these men show increased mortality from accidental falls from ladders and from one level to another.

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Janitors, Maintenance Men and Sextons  
Occupation code 834  
Total deaths 5,410

Men in this group show elevated PMRs for cancers of the oral mesopharynx, stomach, rectum, urinary bladder (age 20-64) and reticulum-cell sarcoma. Arteriosclerotic heart disease including coronary artery disease shows a statistically significant PMR excess. Suicide also showed excess deaths.

---

Firemen and Fire Protection  
Occupation code 850  
Total deaths 1,159

Elevated PMRs are seen for cancer of the brain, and cancers of lymphatic and hematopoietic tissues (Hodgkin's disease, lymphatic leukemia). Cerebral hemorrhage and duodenal ulcer also show elevated PMRs. A number of other causes show PMR elevations based on small numbers of deaths. These are cancer of the urinary bladder, malignant melanoma, bronchiectasis and deaths due to fire and explosion. The U.S. and British studies lack a similar pattern of mortality. A Boston study(33) has associated increased chronic respiratory disease with fire fighting.

---

Guards, Watchmen and Doorkeepers  
Occupation code 851  
Total deaths 1,489

This group shows an excess of deaths from lymphosarcoma, arteriosclerotic heart disease including coronary disease, other myocardial degeneration and cirrhosis of the liver. The U.S. and British study (1961) support the arteriosclerotic heart disease and other myocardial degeneration excess.

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Policemen and Detectives  
Occupation code 853  
Total deaths 1,586

Cancer of the large intestine and liver, pulmonary embolism and infarction, cirrhosis of the liver and homicide show excess deaths. The U.S. study shows a similar pattern.

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Waiters  
Occupation code 875  
Total deaths 198

Although based on small numbers of deaths, the mortality pattern seen in the Washington State data is similar to that seen in both British studies. Tuberculosis, pneumonia and chronic rheumatic heart disease show elevated PMRs.

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Garbage Collectors  
Occupation code 891  
Total deaths 162

Elevated PMRs are seen for rectal cancer, cirrhosis of the liver and motor vehicle accidents.

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Farm Laborers  
Occupation code 902  
Total deaths 3,089

The men in this group show an increased tuberculosis mortality for the entire study period. Malignant neoplasms show a general lowering of PMRs, except for a slight excess in lung and liver cancers. Miscellaneous and non-specific causes of death categories show excesses, probably due to a generally poor quality of medical certification for this group which probably represents the lowest social class in the population. Auto accidents, machinery accidents, death due to fire and explosion and homicide all show increased PMRs. A portion of this group are migrating seasonal laborers, therefore, sudden causes of death may show artificially high PMRs, because death fixes them in the state, where long terminal illness would allow out-migration.

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Shepherders and Wool Workers  
Occupation code 907  
Total deaths 269

Stomach cancer (age 20-64) shows 4 deaths to less than 1 expected. Pneumonia, motor vehicle accidents and suicide also show PMR excesses.

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Fishermen and Oystermen  
Occupation code 962  
Total deaths 3,233

Cancer of the stomach, cancer of the lung (unspecified whether primary or secondary), disorders of character, behavior and intelligence, and accidents (drowning) show elevated PMRs. The stomach and lung cancer excesses are supported by the Registrar General's tables.

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Gardeners, Groundskeepers, Landscapers  
Occupation code 964  
Total deaths 1,898

Elevated PMRs are seen for cancer of the stomach and cancer of the large intestine. Multiple sclerosis shows a PMR of 376 in men age 20-64 based on 4 deaths observed to 1.08 expected. The British tables fail to show a stomach cancer excess.

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Longshoremen and Stevedores  
Occupation code 965  
Total deaths 2,746

Excess deaths are seen for alcoholic cirrhosis of the liver; disorders of character, behavior and intelligence; arteriosclerotic heart disease; and unspecified falls (age 20-64). The balance of the mortality pattern is unremarkable. This is in contrast to both the U.S. and British studies which show SMR elevations for tuberculosis, stomach and lung cancer.

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Loggers  
Occupation code 970  
Total deaths 12,222

Loggers show an increased PMR for tuberculosis, cancer of the stomach, and cancer of the prostate. Disorders of character, behavior and intelligence; bronchiectasis, and diseases of the skin and cellular tissues also show increases. Loggers have a striking excess mortality from accidents. PMRs over 1000 are seen for death due to falling objects (logs) and excess mortality is seen in other work-related accidental categories. The 1950 U.S. tables show a remarkably similar pattern with elevated SMRs for tuberculosis, stomach cancers and accidents.

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Woodworkers, Millworkers, Yardworkers, etc.  
Occupation code 974  
Total deaths 8,582

This is the miscellaneous woodworker category, and as such, contains men in diverse occupations. Total malignant neoplasms show a low PMR. Cancer of the pancreas shows a PMR elevation for men age 20-64 and a low PMR for men age 65+. Malignant neoplasms of the testis, asthma, diseases of other endocrine glands, other myocardial degeneration, hypertensive heart disease, accidents caused by machinery, fire and explosion, and blows from falling objects all show excess deaths. The accidental death excess is corroborated by the 1950 U.S. study.

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Fruit Warehouse Workers  
Occupation code 975  
Total deaths 284

Men in this group show a total malignant neoplasm excess. Neoplasms of the digestive organs (esophagus, large intestine, and pancreas) account for most of this excess. Cancer of the bronchus and lung shows a small PMR elevation and kidney cancer has a PMR of 313 based on 4 deaths observed to about 1.3 expected. Hypertensive heart disease has a PMR of 262 based on 14 deaths observed to 5.3 expected.

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Laborers  
Occupation code 980  
Total deaths 14,489

Men in this group show an excess of death due to tuberculosis and malignant neoplasms of the buccal cavity and pharynx. Most other cancers show a significantly lower PMR. Psychosis, disorders of character, behavior and intelligence, other vascular lesions of the central nervous system, other myocardial degeneration, and other diseases of the heart show excess deaths in spite of the fact that the specific rubrics in these cause groups show deficits. This suggests that cause of death certification in laborers may not be as specific as in other occupation groups.

Diseases of the respiratory system, pneumonia, bronchiectasis, emphysema, duodenal ulcer, other diseases of intestine and peritoneum, cirrhosis of the liver, senility and ill-defined diseases, railway accidents, accidental falls, deaths caused by fire and explosion and homicide all show PMR elevations. The U.S. 1950 study shows elevated SMRs for tuberculosis, malignant neoplasms of buccal cavity and pharynx, other myocardial degeneration, other respiratory system diseases, cirrhosis of the liver and accidents.

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Construction laborers  
Occupation code 982  
Total deaths 2,482

Respiratory tuberculosis, cancer of the larynx, cancer of the lung, and cancer of the urinary bladder show excess deaths. Disorders of character, intelligence and behavior, diseases of the respiratory system including pneumonia, motor vehicle accidents, accidental falls from one level to another, and machinery related accidents show mortality excesses. The 1950 U.S. study shows a quite similar mortality pattern.

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Orchard Laborers  
Occupation code 983  
Total deaths 788

This group shows a mortality pattern similar in some ways to both orchardists (code 201) and farm laborers (code 902). Like the farm laborers, they have excess mortality from tuberculosis, auto accidents, fire, explosion and homicide. Like the orchardists, they show an excess of bowel cancer for the same time period (1950-60). Again, like the orchardists, they show a slight lung cancer excess. Other farmer groups show a deficit from this cause. They also show an excess of fatal ulcers of the stomach.

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Institutionalized, Retarded, Nonemployable, etc.  
Occupation code 997  
Total deaths 1,046

This group shows a bizarre pattern of mortality. Respiratory tuberculosis, psychosis, disorders of character, behavior and intelligence, other vascular lesions of the central nervous system, inflammatory diseases of the central nervous system, multiple sclerosis, other diseases of the heart, diseases of veins, pneumonia, other diseases of intestine and peritoneum, intestinal obstruction with hernia, and infections of the kidney all show PMR excesses. Malignant neoplasms and accidental deaths show very low PMRs. This pattern is consistent with the expected cause of death distribution of institutionalized men.

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Not Stated or Unknown  
Occupation code 999  
Total deaths 6,732

This group resembles laborers (occupation code 980) in its mortality pattern. Excess deaths are seen for respiratory tuberculosis, asthma and diabetes mellitus in men age 20-64 at death, psychosis, disorders of character, behavior and intelligence, arteriosclerotic heart disease, pneumonia, gastric ulcer, cirrhosis of the liver, other diseases of the urinary system, rheumatoid arthritis, senility and ill-defined diseases, railway accidents, accidental falls, other accidents, and deaths caused by fire and explosion.

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## DISCUSSION

This section consists of an examination of the mortality patterns of groups of selected occupations with similar environmental exposures. Finding similar mortality patterns in occupations with similar exposures adds significance to the finding in the individual occupation. However, misclassification of occupation can give the same result.

### 1. Farmers

Considering the farmers as a group, it is obvious that in this state, occupational exposures differ markedly depending on the type of farming.

The cancer pattern seen in these men, I think, reflects these differences. Respiratory cancer shows an excess in orchardists and deficits in the other farming types. Pancreatic cancer shows an excess in nurserymen; stomach cancer in dairy farmers; kidney cancer in wheat and cattle ranchers; brain cancer in dairy, poultry and cattle ranchers; etc. Leukemia and brain cancers show excesses in farmers who work with chickens and cows. Since both species suffer endemic leukemia-like diseases, animal to human transmission of disease might be considered when etiologic hypotheses are formulated.

The other general point which the farmers mortality patterns make is that lumping all farmers into a single occupational group will obscure differences in mortality seen in the various farming sub-groups. In this study, the farmer NEC category (Occupation code 200) certainly represents some misclassification of other farmer types. Most of the causes of death which show excesses in the farmer NEC category show a greater excess in other specific farmer categories.

PMRs AND CANCER DEATHS FOR FARM SUB-GROUPS

Code	ICD number → Cause of Death → Occupation ↓	151 Ca of Stomach		157 Ca of Pancreas		162.1 Ca of Lung		180 Ca of Kidney		193.0 Brain Ca		204 Leukemia	
		PMR	Deaths	PMR	Deaths	PMR	Deaths	PMR	Deaths	PMR	Deaths	PMR	Deaths
200	Farmers	<u>117</u>	(485)	109	(251)	<u>81</u>	(272)	87	(68)	106	(46)	108	(175)
201	Orchardists	67	(23)	106	(24)	<u>133</u>	(61)	109	(9)	96	(6)	84	(13)
202	Nurserymen	78	(4)	<u>258</u>	(9)	92	(7)	0	(0)	94	(1)	128	(3)
203	Cattle Ranchers	90	(39)	97	(26)	<u>72</u>	(43)	<u>211</u>	(20)	<u>176</u>	(12)	106	(20)
204	Dairy Farmers	<u>143</u>	(40)	77	(14)	<u>56</u>	(20)	45	(3)	<u>187</u>	(10)	134	(17)
205	Wheat Farmers	98	(50)	94	(30)	<u>61</u>	(43)	151	(17)	106	(8)	<u>147</u>	(34)
206	Poultry Farmers	139	(13)	118	(7)	56	(6)	92	(2)	238	(4)	<u>269</u>	(11)

( ) = numbers of deaths  
Underlined PMR = P < .05

### 2. Foresters, Millworkers, Carpenters

Like the farmers, men who work in these occupations show interesting similarities and differences in mortality. The following table examines the cancer pattern in these occupations. Stomach cancer shows a modest increase

in PMR in most of these occupational groups. This suggests that ingested (or inhaled and swallowed) wood particles may cause gastric cancer. The gastric cancer excess may also be related to the fact that a high proportion of men in these trades, especially the loggers and mill workers, use chewing tobacco. The hematopoietic cancer increases, especially in the paper, pulp and plywood workers, suggests that physical and chemical breakdown products of wood may be carcinogenic. Men who work in sawmills, where wood is simply machined, do not show a cancer excess as seen in the paper, pulp and plywood industries.

These mortality figures are averages for all men in a given occupation. Mortality figures for men working in high-risk processes may be much higher(34).

PMRs AND CANCER DEATHS FOR ALL WOOD-EXPOSURE OCCUPATIONS

Code	ICD number Malignant Neoplasm→ Occupation+	151 Stomach		152 Sm Intestine		201 Hodgkin's		203 Mult Myeloma		204 Leukemia		140-204 All	
		PMR	Deaths	PMR	Deaths	PMR	Deaths	PMR	Deaths	PMR	Deaths	PMR	Deaths
103	Foresters	111	(2)	0	(0)	0	(0)	400	(2)	180	(2)	<u>177</u>	(40)
410 411	Cabinetmakers and Carpenters	<u>128</u>	(271)	87	(3)	<u>162</u>	(38)	129	(36)	117	(39)	<u>106</u>	(2283)
491 704 974	Millwrights, Sawmill and Other Millworkers	108	(202)	140	(7)	91	(21)	89	(23)	100	(62)	<u>95</u>	(1839)
500	Paper and Pulp Mill Workers	115	933)	<u>447</u>	(5)	<u>192</u>	(12)	<u>243</u>	(12)	140	(23)	103	(364)
706	Plywood Workers	<u>153</u>	(32)	0	(0)	92	(4)	190	(7)	<u>193</u>	(23)	104	(273)
970	Loggers	<u>120</u>	(223)	66	(4)	65	(18)	71	(18)	84	(76)	<u>93</u>	(1798)

( ) = numbers of deaths  
Underlined PMR = P < .05

### 3. Metal Workers

The following table presents the mortality picture for selected cancers in ten metal-exposure occupations. Of the ten occupational groups, all showed increases in respiratory cancer PMRs. Only machinists and structural metal workers showed PMRs under 115. Four groups showed PMR elevations for urinary bladder cancer (boilermakers, plumbers, structural metal workers and welders). Machinists, plumbers and structural metal workers show excesses for cancer of the tongue based on small numbers. Pancreatic cancer shows a mortality increase in aluminum millworkers and in sheet metal workers, while malignant lymphoma shows an increase in aluminum millworkers and plumbers.

The mortality patterns seen in these groups suggest that respiratory cancer may be induced in humans by inhalation of metals and metallic compounds. Certain metals have been shown to be involved in respiratory carcinogenesis, so the lung cancer excess seen in these occupational groups is not surprising.

The urinary bladder cancer excess suggests that metals or metallic urinary excretion products may be carcinogenic for urinary bladder mucosa.

The simultaneous pancreatic cancer and lymphoma increase seen in aluminum millworkers is not seen in any of the other occupational groups studied here, and may be related to coal tar pitch volatiles rather than to metal exposures (35).

OBSERVED AND EXPECTED DEATHS AND  
PMRs FOR SELECTED CANCERS IN METAL-EXPOSURE OCCUPATIONS

Code	ICD number → Malignant Neoplasm → Occupation †	141 Tongue			157 Pancreas			160-165 Respiratory			181 Urinary Bladder			200 and 202 Lymphoma		
		Obs.	Exp.	PMR	Obs.	Exp.	PMR	Obs.	Exp.	PMR	Obs.	Exp.	PMR	Obs.	Exp.	PMR
		403	Boilermakers	1	1.1	87	12	12.9	93	76	50.6	150	12	8.3	144	5
435	Smelter Workers	0	1.0	0	7	8.0	88	53	32.3	164	1	5.0	20	3	4	75
465	Machinists	8	4.4	180	45	46.9	96	199	189.5	105	29	31.0	92	18	19	95
492	Metal Molders	0	0	0	2	4.3	46	21	15.5	135	3	3.0	100	2	2	100
510	Plumbers	5	3.3	152	26	34.7	75	185	142.3	130	29	21.1	137	22	15	146
523	Structural Metal	4	1.4	295	14	14.1	99	64	59.2	108	17	8.3	203	8	8	100
525	Sheet Metal Workers	0	2.0	0	21	15.9	132	90	68.7	131	10	8.8	113	8	8	100
530	Tool and Die Makers	0	0	0	2	3.8	52	26	16.7	155	0	2.0	0	1	1	100
526	Aluminum Millworkers	0	1.0	0	13	6.4	204	40	31.2	128	3	3.1	95	10	4	250
721	Welders and Flame Cutters	1	1.7	58	10	15.9	63	92	77.3	119	12	7.4	162	10	9	111
	TOTAL	19	15.9	119	152	162.9	93	846	683.3	123	116	98.0	118	87	75	115

#### 4. Petroleum Products Workers

Men who work around garages and gas stations and men who deliver fuel oil and gasoline show an excess of urinary bladder cancer. This suggests that a volatile constituent of gasoline and fuel oil or its urinary excretion product may be carcinogenic for urinary bladder mucosa. Since vehicle drivers also have a bladder cancer excess, it may be automotive exhaust rather than gasoline which is the critical variable.

Code	Urinary Bladder Cancer Deaths (ICD 181)			
	Occupation	Observed	Expected	PMR
632	Gas Station workers, Fuel Oil dealers, garage owners	21	14	147
472	Auto mechanics	30	20	153
716	Fuel Oil, gasoline truckers	3	1	280

#### 5. Motor Vehicle Drivers

Five of six occupational groups engaged in driving cars or trucks showed increased urinary bladder cancer PMRs.

Code	Urinary Bladder Cancer Deaths (ICD 181)			
	Occupation	Observed	Expected	PMR
641	Bus Driver	5	6	91
650	Deliverymen and Routemen	5	3	183
656	Milk Route Deliverymen	2	1	167
714	Taxicab Driver	8	4	197
715	Truck Driver	42	30	140
716	Fuel Oil Truck Driver	3	1	280

Only bus drivers failed to show an excess. These men are exposed to automotive exhaust fumes which are known to contain carcinogens.

#### 6. Railroad Workers

Railroad engineers, firemen and brakemen showed increased PMRs for colon cancer. Conductors and other railroad workers (primarily laborers) showed no increase.

Colon Cancer Deaths (ICD 153)				
<u>Code</u>	<u>Occupation</u>	<u>Observed</u>	<u>Expected</u>	<u>PMR</u>
252	Railroad Conductors	10	13	77
454	Railroad Engineers	36	23	156
460	Railroad Firemen	8	4	205
469	Railroad Workers, NEC	67	82	82
640	Railroad Brakemen	20	16	128

#### 7. Painters and Decorators

Men working as painters, paperhangers, decorators, etc. show excess deaths due to lung cancer suggesting that volatile constituents of certain paints may be carcinogenic.

Deaths due to primary cancer of Trachea, Bronchus and Lung (ICD 162)				
<u>Code</u>	<u>Occupation</u>	<u>Observed</u>	<u>Expected</u>	<u>PMR</u>
420	Decorators, Window Dressers	8	4	191
501	Paperhangers, Interior Painters and decorators	33	23	140
694	Painters, Construction and Maintenance, Sign Painters	138	105	131

#### 8. Fabric Workers

Men working with fabrics show increased mortality from urinary bladder cancer, presumably due to exposure to dyes. Dry cleaning workers are also exposed to solvents.

Urinary Bladder Cancer Deaths (ICD 181)				
<u>Code</u>	<u>Occupation</u>	<u>Observed</u>	<u>Expected</u>	<u>PMR</u>
412	Canvas makers, Fabric workers	3	1	236
524	Tailors	6	4	141
535	Upholsterers	5	2	265
674	Laundry and Dry Cleaning Workers	9	6	152

## CONCLUSION

The conclusion of this study is that the Washington State death certificate is a useful source of both occupational and cause of death information. The findings of this study agree quite well with the 1950 U.S. occupational mortality study and with the Registrar General's occupational mortality studies published for England and Wales. In the absence of population data, a proportional mortality ratio analysis yielded essentially the same information as the population-based standardized mortality ratio used in the U.S. and British studies.

Tailoring the occupational code to fit the occupations and industries present in this state and extending the analysis to include the entire age span gave information which would have been otherwise obscured.

I view the specific occupational mortality associations developed by this study as providing a rational basis for future study. Application of this method in other death files would seem worthwhile.

## ACKNOWLEDGEMENTS

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The computer program was written by John Jensen. Janet Daling and Wes Weinhold provided liaison for data management.

Cynthia Howarth did a literature search and helped with collation of computer output.

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OCCUPATIONAL CROSS REFERENCE TABLE

Washington State Occupational Mortality Study, 1950 U.S. Study, and Registrar General's Studies 1949-53 and 1959-63

<u>Washington State 1950-71</u>			<u>United States 1950 (14)</u>			<u>England and Wales 1949-53 (12)</u>			<u>England and Wales 1959-63 (13)</u>			
Occ. Code	Description	Page	Description	Page	Occ. Group	Description	Page	Occ. Group	Description	Page	Occ. Group	Description
000	Accountants, auditors, assessors, mathematicians, statisticians, actuaries	137	Accountants and auditors	364	185	Qualified accountants	296	195	Accountants, professional; company secretaries, registrars	192	169	Aircraft pilots, navigators, and flight engineers
012	Airplane pilots and navigators	---	---	---	---	---	---	---	Aircraft pilots, navigators, and flight engineers	297	195	Surveyors, architects
013	Architects	138	Architects	358	184	Architects, town planners, ship designers, surveyors	295	195	Painters, sculptors, and related artists	292	194	Chemists, physical and biological sciences
014	Artists and art teachers	139	Artists and art teachers	368	185	Painters, sculptors, and engravers	---	---	---	---	---	---
021	Chemists	141	Chemists	360	184	Chemists (not pharmaceutical)	298	196	Clergy, ministers, members of religious orders	286	192	University teachers
022	Chiropractors	---	---	---	---	---	---	---	---	---	---	---
023	Clergymen	143	Clergymen	85	134	Clergymen (Church of England)	281	190	Dental practitioners	312	197	Draughtsmen
060	Professors and instructors	145	College presidents, professors and instructors	91	140	Teachers	293	194	Authors, journalists, and related workers	278	189	Managers (N.E.C.)
071	Dentists	146	Dentists	352	184	Dental practitioners	288	192	Civil, structural and municipal engineers	288	192	Civil, structural and municipal engineers
074	Draftsmen	147	Designers and draftsmen	359	184	Industrial designers, draughtsmen	290	193	Electrical engineers	290	193	Electrical engineers
075	Editors and reporters	140	Authors, editors, and reporters	365	185	Authors, journalists, and publicists	278	189	Managers (N.E.C.)	278	189	Managers (N.E.C.)
076	Newspaper owners, publishers, managers	165	Other specified managers and officials	420	190	Managers (N.E.S.)	288	192	Civil, structural and municipal engineers	288	192	Civil, structural and municipal engineers
082	Engineers, civil	149	Engineers, civil	92	141	Professional engineers and surveyors	290	193	Electrical engineers	290	193	Electrical engineers
083	Engineers, electrical	150	Engineers, electrical	92	141	Professional engineers and surveyors	290	193	Electrical engineers	290	193	Electrical engineers

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Washington State 1950-71United States 1950England and Wales 1949-53England and Wales 1959-63

Occ. Code	Description	Page	Description	Page	Occ. Group	Description	Page	Occ. Group	Description
085	Engineers, mechanical	151	Engineers, mechanical	141	92	Professional engineers and surveyors	141	289	Mechanical engineers
093	Engineers, N.E.C.	152	Other technical engineers	141	92	Professional engineers and surveyors	141	---	---
103	Foresters and conservationists	---	---	160	117	Foresters and woodmen	160	005	Foresters and woodmen
104	Funeral directors	---	---	188	393	Funeral directors and assistants	188	---	---
105	Lawyers and judges	153	Lawyers and judges	137	88	Judges, barristers, etc. solicitors	137	299	Judges, barristers, advocates, solicitors
120	Musicians, music teachers	154	Musicians, music teachers	186	375	Musicians	186	294	Stage managers, actors, entertainers, musicians
152	Optometrists	---	---	---	---	---	---	---	---
154	Personnel and labor relations workers	---	---	---	---	---	---	275	Personnel managers
160	Pharmacists, druggists	156	Pharmacists	184	354	Pharmacists	184	283	Pharmacists, dispensers
161	Photographers	---	---	187	386	Photographers	187	---	---
162	Physicians and surgeons	157	Physicians and surgeons	138	89	Registered medical practitioners, radiologists	138	280	Medical Practitioners, qualified
164	Radio operators	---	---	181	327	Radio and telegraph operators	181	202	Telegraph and radio operators
181	Surveyors	160	Surveyors	184	358	Architects, town planners, ship designers, surveyors	184	297	Surveyors, architects
184	Teachers	161	Teachers	140	91	Teachers (not music)	140	287	Teachers (N.E.C.)
185	Technicians, medical and dental	162	Technicians, medical and dental	184	356	Other medical auxiliaries	184	285	Medical workers N.E.C.

Washington State 1950-71

United States 1950

England and Wales 1949-53

England and Wales 1959-63

Occ. Code	Description	Page	Description	Page	Occ. Group	Description	Page	Occ. Group	Description
194	Veterinarians	---	---	184	353	Veterinary surgeons and practitioners	---	---	---
195	Professional, technical and kindred workers, N.E.C.	163	Other professional, technical and kindred workers	---	---	---	197	311	Professional workers N.E.C.
196	Students	---	---	---	---	---	---	340	Students
200	Farmers, N.E.C.	135	Farmers and farm laborers	50	1	Farmers, farm managers	---	002	Agricultural workers N.E.C.
201	Orchardists	---	---	---	---	---	---	---	---
202	Nurserymen	---	---	51	2	Gardners, mkt. gardners, nurserymen	---	---	---
203	Ranchers, cattle and sheep	---	---	---	---	---	---	---	---
204	Dairy farmers	---	---	---	---	---	---	---	---
205	Wheat and grain farmers	---	---	---	---	---	---	---	---
206	Poultry farmers	---	---	---	---	---	---	---	---
249	Florists	---	---	---	---	---	---	---	---
250	Buyers and department heads, store	---	---	181	330	Buyers, advertising agents and managers	---	---	---
251	Buyers and shippers, farm products	---	---	---	---	---	---	---	---
252	Railroad conductors	---	---	179	308	Ticket collectors and examiners	---	---	---
253	Creditmen	---	---	183	350	Moneylenders, pawnbrokers	---	238	Finance, insurance brokers, financial agents
255	City, civil service employee	---	---	---	---	---	---	---	---
262	Managers and superintendents, building	---	---	---	---	---	---	---	---
270	Officials and administrators public administration	164	Officials and inspectors state and local administration	115	66	Civil service and local authority, administrative and executive officers	---	223	Civil servants, local authority officials (so described)

Washington State 1950-71United States 1950England and Wales 1949-53England and Wales 1959-63

Occ. Code	Description	Page	Description	Page	Occ. Group	Description	Page	Occ. Group	Description
275	Officials, lodge, society union	---	---	---	---	---	---	---	---
280	Postmasters	---	---	---	---	---	---	---	---
285	Purchasing agents and buyers N.E.C., sales managers	---	---	182	331	Sales managers (manufacturers)	189	276	Sales managers
290	Managers, officials, proprietors, N.E.C.	168	Managers, officials, and proprietors (N.E.C.), whole-sale and retail trade	190	420	Managers (N.E.S.)	189	278	Managers N.E.C.
292	Lumber company managers, owners; lumber salesmen	---	---	---	---	---	---	---	---
297	Furniture store owners, managers, clerks	---	---	---	---	---	---	---	---
298	Grocer, grocery clerks	---	---	127	78	Proprietors of retail businesses for the sale of grocery and provisions	177	230	Proprietors and managers, food sales
304	Baggagemen, transportation	---	---	---	---	---	---	---	---
305	Bankers, bank clerks, managers	---	---	183	346	Bankers, bank managers, inspectors	---	---	---
310	Bookkeepers, cashiers and payroll clerks	171	Bookkeepers	188	395	Costing and accounting clerks	176	221	Clerks, cashiers, office machine operators
314	Dispatchers and starters, vehicle	---	---	---	---	---	172	200	Traffic controllers and dispatchers, transport
321	Adjusters, examiners, investigators, inspectors	---	---	183	349	Auctioneers, estate agents, valuers	180	239	Salesmen, services, valuers, auctioneers
323	Mail carriers	172	Mail carriers	123	74	Postmen, post office sorters	173	203	Postmen, mail sorters
340	Postal Clerks	---	---	123	74	Postmen, post office sorters	173	203	Postmen, mail sorters
343	Shipping and receiving clerks	---	---	---	---	---	---	---	---

Washington State 1950-71			United States 1950			England and Wales 1949-53			England and Wales 1959-63			
Occ. Code	Description	Page	Description	Page	Occ. Group	Description	Page	Occ. Group	Description	Page	Occ. Group	Description
350	Stock clerks and store-keepers, warehousemen	---	---	188	397	Storekeepers	188	210	Warehousemen, store-keepers and assistants	175	210	Warehousemen, store-keepers and assistants
352	Telegraph operators	---	---	181	327	Radio and telegraph operators	181	202	Telegraph and radio operators	281	202	Telegraph and radio operators
354	Ticket, station and express agents	---	---	179	308	Ticket collectors and examiners	179	---	---	---	---	---
363	Public Utility Workers	---	---	---	---	---	---	---	---	---	---	---
370	Clerical and kindred workers	174	Other clerical and kindred workers	188	394	Clerks (N.E.S.)	188	221	Clerks, cashiers, and office machine operators	176	221	Clerks, cashiers, and office machine operators
380	Travelling salesmen, sales representatives, advertising agents	181	Salesmen and sales clerks	126	77	Commercial travellers and canvassers	126	237	Commercial travellers, manufacturers' agents	180	237	Commercial travellers, manufacturers' agents
385	Insurance agents, brokers, underwriters, appraisers	176	Insurance agents and brokers	133	84	Insurance agents, brokers and canvassers	133	238	Finance, insurance brokers, financial agents	180	238	Finance, insurance brokers, financial agents
386	Car salesmen	---	---	---	---	---	---	---	---	---	---	---
387	Fur traders, mink ranchers, furriers	---	---	---	---	---	---	---	---	---	---	---
390	Newsboys	---	---	131	82	Costermongers, newspaper sellers, other hawkers	131	235	Street vendors, hawkers	179	235	Street vendors, hawkers
393	Real estate agents and brokers	177	Real estate agents and brokers	183	349	Auctioneers, estate agents, valuers	183	239	Salesmen, services; valuers and auctioneer	180	239	Salesmen, services; valuers and auctioneer
395	Stock and bond salesmen	---	---	183	347	Stock brokers, stock jobbers	183	238	Finance, insurance brokers, financial agents	180	238	Finance, insurance brokers, financial agents
396	Sales Clerks, N.E.C.	181	Salesmen and sales clerks (N.E.C.) retail trade	183	343	Salesmen, shop assistants, etc.	183	233	Shop salesmen and assistants, non-food	178	233	Shop salesmen and assistants, non-food
400	Carpet makers, layers	---	---	173	247	Carpet weavers	173	---	---	---	---	---
401	Bakers	183	Bakers	101	52	Bakers, pastry cooks, etc.	101	120	Bakers, pastry cooks	156	120	Bakers, pastry cooks
402	Blacksmiths	184	Blacksmiths, forgemmen, and hammermen	168	195	Blacksmiths	168	043	Smiths, forgemmen	139	043	Smiths, forgemmen

Washington State 1950-71United States 1950England and Wales 1949-53England and Wales 1959-63

Occ. Code	Description	Page	Description	Page	Occ. Group	Description	Page	Description	Page	Occ. Group	Description
403	Boilemakers	185	Boilemakers	---	---	---	---	---	---	---	---
405	Brickmasons, stonemasons, tile setters	200	Masons, tile setters and stone cutters	108	59	Bricklayers	161	Bricklayers, tile setters	150	150	Bricklayers, tile setters
406	Building, Contractors, Construction Contractors	---	---	177	290	Foremen, gangers (building and contractors)	162	Builders (so described)	153	153	Builders (so described)
407	Boatbuilders	---	---	---	---	---	---	---	---	---	---
411	Carpenters, Cabinetmakers	188	Carpenters	103	54	Carpenters, joiners	149	Carpenters and joiners	080	080	Carpenters and joiners
412	Canvas makers, fabric workers	---	---	173	250	Other skilled textile workers	155	Textile fabrics, etc. production workers N.E.C.	108	108	Textile fabrics, etc. production workers N.E.C.
413	Cement and concrete finishers	210	Plasterers and cement finishers	178	292	Plasterers	162	Plasterers, cement finishers, terrazzo workers	152	152	Plasterers, cement finishers, terrazzo workers
415	Cranemen, derrickmen, hoistmen	191	Cranemen, hoistmen and construction machinery operators	158	109	Drivers of stationary engines and cranes, etc.	164	Crane and hoist operators, slingers	171	164	Crane and hoist operators, slingers
416	Oil drillers, well drillers	---	---	178	300	Well and mine sinkers and borers	---	---	---	---	---
420	Decorators, window dressers, paperhangers, interior painters	---	---	179	303	Foremen, overlookers, painters and decorators	163	Painters, decorators N.E.C.	161	163	Painters, decorators N.E.C.
421	Electricians	192	Electricians	83	34	Electricians (house, ship, factory)	141	Electricians	052	141	Electricians
425	Excavators, graders, pavers, highway maintenance	---	---	178	299	Pavers, street masons, and asphalters	165	Operators of earth moving and other construction equipment	172	165	Operators of earth moving and other construction equipment
430	Foremen, N.E.C.	193	Foremen (N.E.C.), manufacturing, durable goods	177	290	Foremen and gangers (building and contracting)	---	---	---	---	---
434	Glaziers	---	---	178	293	Glaziers	---	---	---	---	---
435	Smelter workers, furnacemen	225	Furnacemen, smeltermen and heaters	64	15	Furnacemen	138	Furnacemen, metal	040	138	Furnacemen, metal
444	Inspectors, scalers, graders log and lumber	---	---	---	---	---	---	---	---	---	---

Washington State 1950-71United States 1950England and Wales 1949-53England and Wales 1959-63

Occ. Code	Description	Page	Description	Page	Occ. Group	Description	Page	Occ. Group	Description	Page
450	Inspectors, N.E.C.	---	---	---	---	---	---	---	---	---
451	Jewelers, watchmakers, etc.	---	---	---	30	Watch, clock, and instrument makers	79	073	Watch and chronometer makers and repairers	147
453	Linemen and Servicemen, telegraph, telephone, power	196	Linemen and servicemen, telegraph, telephone, power	---	35	Linemen and cable jointers	84	052	Linemen and cable jointers	141
454	Locomotive engineers	197	Locomotive engineers	---	69	Locomotive engine drivers and motormen	118	193	Drivers, motormen, firemen, railway engine	170
460	Locomotive firemen	198	Locomotive firemen	---	305	Locomotive engine firemen	179	193	Drivers, motormen, firemen, railway engine	170
462	Manufacturing workers	266	Operatives, etc., non-specified manufacturing industries	---	---	---	---	---	---	---
465	Machinists	199	Machinists and job setters	---	205	Press tool setters, machine setters, setter operatives	169	064	Machine tool setters, setter-operatives	144
469	Railroad workers, N.E.C.	---	---	---	309	Running Shed and Other railway workers	179	---	---	---
472	Mechanics and repairmen, automobile	202	Mechanics and repairmen, automobile	---	209	Motor and motorcycle mechanics	169	---	---	---
476	Lumber, plywood, veneer workers; maintenance	---	---	---	---	---	---	---	---	---
480	Mechanics and repairmen, N.E.C.	204	Other mechanics and repairmen, Loom fixers	---	---	---	---	---	---	---
490	Millers, grain, flour, and feed	---	---	---	261	Grain millers	175	---	---	---
491	Millwrights, sawmill	---	---	---	---	---	---	---	---	---
492	Molders, metal	206	Molders, metal	---	17	Molders and core makers	66	042	Molders and core makers	139
493	Motionpicture projectionists	---	---	---	376	Stagehands, cinematograph operators	186	---	---	---
500	Paper and pulp millworkers	262	Operatives and kindred workers (N.E.C.) paper and allied products	---	281	Makers of paper, paperboard	177	130	Makers of paper and paperboard	158
501	Paperhangers and decorators (painters)	234	Painters except construction and maintenance	---	65	Other painters and decorators	114	161	Painters, decorators, N.E.S.	163

Washington State 1950-71

United States 1950

England and Wales 1949-53

England and Wales 1959-63

Occ. Code	Description	Page	Description	Page	Description	Occ. Group	Page	Description	Occ. Group	Page	Description
502	Pattern and model makers (except paper)	---	---	---	Pattern makers	276	176	Pattern makers	084	150	Pattern makers
505	Plasterers and lathers	210	Plasterers and cement finishers	210	Plasterers	292	178	Plasterers	152	162	Plasterers, cement finishers, terrazzo workers
507	Shipyard workers, shipfitters	---	---	---	Shipwrights	204	169	Shipwrights	---	---	---
510	Plumbers, pipefitters	211	Plumbers, pipefitters	211	Plumbers (not chemical plumbers)	29	78	Plumbers (not chemical plumbers)	070	146	Plumbers, lead burners, pipefitters
512	Pressmen and plate printers, printing	212	Printing craftsmen except compositors and typesetters	212	Printing machine minders, etc., printers	57	106	Printing machine minders, etc., printers	134	159	Printers (so described)
514	Roofers and slaters	---	---	---	---	---	---	---	---	---	---
515	Shoemakers and repairers, leatherworkers	213	Shoemakers and repairers, except factory	213	Boot and shoemakers and repairers (not factory)	47	96	Boot and shoemakers and repairers (not factory)	091	151	Shoemakers and shoe repairers
520	Stationary engineers and firemen	214	Stationary engineers	214	Drivers of stationary engines	109	158	Drivers of stationary engines	174	165	Stationary engine, materials, handling plant operators, etc.
521	Stonecutters and carvers	---	---	---	Masons, stonecutters	60	109	Masons, stonecutters	151	162	Masons, stonecutters, slate workers
523	Structural metal workers	215	Structural metal workers	215	Structural metal workers	---	---	---	---	---	---
524	Tailors	216	Tailors and furriers	216	Tailors	50	99	Tailors	110	155	Tailors, dress, light clothing makers
525	Tinsmiths, coppersmiths and sheet metal workers	217	Tinsmiths, coppersmiths and sheet metal workers	217	Sheet iron and sheet metal workers	200	168	Sheet iron and sheet metal workers	060	142	Sheet metal workers
526	Aluminum workers	---	---	---	---	---	---	---	---	---	---
527	Cannery and food processing workers	---	---	---	---	---	---	---	123	157	Food processors (N.E.C.)
528	Flooring workers (covering, etc)	---	---	---	---	---	---	---	---	---	---
530	Tool and die makers and setters, toolmakers, etc.	218	Toolmakers, and die makers and setters	218	Precision fitters, tool makers, gunsmiths, etc.	25	74	Precision fitters, tool makers, gunsmiths, etc.	066	144	Tool makers, tool-room fitters
535	Upholsterers	---	---	---	Upholsters, coach trimmers, etc.	257	174	Upholsters, coach trimmers, etc.	111	155	Upholsterers and related workers



Washington State 1950-71United States 1950England and Wales 1949-53England and Wales 1959-63

Occ. Code	Description	Page	Description	Page	Occ. Group	Description	Page	Occ. Group	Description
693	Packers and wrappers	---	---	188	399	Packers and bottlers	176	211	Packers, labellers, etc.
694	Painters	234	Painters, except construction and maintenance	114	65	Other painters and decorators	163	161	Painters, decorators N.E.C.
703	Sailors, deckhands, seamen, N.E.C.	236	Sailors and deckhands	181	322	Bargemen, boatsmen, tugmen	169	191	Deck and engineroom ratings, barge and boatmen
704	Sawyers, sawmill workers	---	---	104	55	Sawyers, wood cutting machinists	149	082	Sawyers and wood working machinists
706	Plywood workers	---	---	---	---	---	---	---	---
714	Taxicab drivers and chauffeurs	241	Taxicab drivers and chauffeurs	121	72	Drivers of self propelled passengers and goods vehicles	171	196	Drivers of other road passenger vehicles
715	Truck and tractor drivers	244	Truck drivers and deliverymen	121	72	Drivers of self propelled passengers and goods vehicles	171	197	Drivers of road goods vehicles
716	Fuel and truck drivers	---	---	---	---	---	---	---	---
721	Welders and flame cutters	246	Welders and flame cutters	86	37	Oxyacetylene or electric welders	143	063	Gas, electric, welders cutters; braziers
722	Operatives and kindred workers, N.E.C.	247	Other specified operatives and kindred workers	---	---	---	---	---	---
724	Forest service, game dept. workers	---	---	---	---	---	---	---	---
726	Ordnance plant workers	---	---	---	---	---	---	---	---
810	Attendants, hospitals and institutions	---	---	187	385	Hospital or ward orderlies, attendants	186	266	Hospital or ward orderlies; ambulance men
813	Attendants, recreation and amusements	---	---	---	---	---	186	267	Service, sport and recreation workers N.E.C.
814	Barbers	271	Barbers, beauticians, manicurists	154	105	Barbers, hairdressers and manicurists	185	263	Hairdressers, manicurists, beauticians
815	Bartenders	283	Waiters, bartenders and counter workers	152	103	Barmen	182	254	Barmen

Washington State 1950-71

United States 1950

England and Wales 1949-53

England and Wales 1959-63

Occ. Code	Description	Page	Description	Page	Occ. Group	Description	Page	Occ. Group	Description
817	Restaurant, cafe owners and operators	---	---	187	381	Proprietors and managers of restaurants	187	253	Publicans and innkeepers
818	Brewery workers	---	---	102	53	Makers of alcoholic drinks	157	122	Brewers, wine makers and related workers
819	Hotel and motel owners and managers	---	---	151	102	Publicans, owners, etc. of hotels or inns	182	255	Lodging house, hotel keepers, housekeepers and stewards
820	Bootblacks or shoe shine operators	---	---	---	---	---	---	---	---
825	Cooks, candymakers, chefs	276	Cooks, ex. private household	---	---	---	183	257	Cooks
826	Dishwashers	---	---	---	---	---	183	258	Kitchen hands
831	Elevator operators	278	Elevator operators	---	---	---	---	---	---
832	Housekeepers and stewards	---	---	187	384	Stewards	182	255	Lodging house, hotel keepers, housekeepers and stewards
833	Window cleaners and wall washers	---	---	188	391	Window cleaners	185	262	Office cleaners and window cleaners
834	Janitors, building maintenance men, sextons	---	---	---	---	---	184	260	Caretakers, office keepers
841	Porters	---	---	187	383	Hotel and hotel porters, doorkeepers	---	---	---
850	Firemen and fire protection workers	279	Firemen and fire protection	185	370	Fire brigade officers and men	181	250	Fire brigade officers and men
851	Guards, watchmen and doorkeepers	280	Guards and watchmen	186	371	Watchmen	181	252	Guards and related workers, N.E.C.
853	Police and detectives	281	Policemen, sheriffs, and marshals	150	101	Police, other ranks	181	251	Police officers and men
875	Waiters	283	Waiters, bartenders and counter workers	153	104	Waiters, stillroom hands	183	256	Restauraners, waiters, counterhands
891	Garbage collectors	---	---	---	---	---	---	---	---
892	Junk dealers, salvage workers	---	---	---	---	---	---	---	---

Washington State 1950-71United States 1950England and Wales 1949-53England and Wales 1959-63

Occ. Code	Description	Page	Description	Page	Occ. Group	Description	Page	Occ. Group	Description
902	Farm laborers	135	Farmers and farm laborers	160	113	Shepherds and other agricultural workers	132	002	Agricultural workers, N.E.C.
907	Shepherd, wool worker	---	---	160	113	Shepherds and other agricultural workers	---	---	---
962	Fishermen and oystermen	288	Fishermen and oystermen	160	111	Fishermen	132	000	Fishermen
964	Gardeners, groundskeepers and landscapers	---	---	51	7	Gardeners, market gardeners and nurserymen	133	004	Gardeners and groundsmen
965	Longshoremen and stevedores	290	Longshoremen and stevedores	181	321	Wharfingers and stevedores	174	207	Stevedores and dock laborers
966	Produce, seed, feed, and grain company workers	---	---	---	---	---	---	---	---
970	Lumbermen, woodsmen, and loggers	293	Lumbermen, raftsmen and woodchoppers	160	117	Foresters and woodmen	133	005	Foresters and woodmen
974	Woodworkers, mill workers, shingle weavers, N.E.C.	299	Laborers - furniture, saw and planing mills	---	---	---	---	---	---
975	Fruit warehouse workers	---	---	---	---	---	---	---	---
980	Laborers	338	Laborers (N.E.C.) other industries	---	---	---	168	188	Laborers and unskilled workers; other, N.E.C.
982	Construction laborers	323	Laborers (N.E.C.), construction	107	58	Builders, bricklayers, plasterers, masons, laborers	168	187	Laborers and unskilled workers; building and contracting
983	Orchard laborers	---	---	---	---	---	---	---	---
985	Chemical workers	316	Laborers (N.E.C), chemical and allied products	63	14	Workers in chemical and allied trades	166	181	Laborers and unskilled workers; chemical and allied trades, N.E.C.

EXHIBIT 1 -- Death Certificate

WASHINGTON STATE DEPARTMENT OF SOCIAL AND HEALTH SERVICES  
BUREAU OF VITAL STATISTICS

**CERTIFICATE OF DEATH**

WRITE OR PRINT IN PERMANENT INK

LOCAL FILE NUMBER

STATE FILE NUMBER

1. DECEASED—NAME FIRST MIDDLE LAST		2. SEX		3. DATE OF DEATH (MONTH, DAY, YEAR)	
4. RACE WHITE, NEGRO, AMERICAN INDIAN, ETC. (SPECIFY)		5a. AGE—LAST BIRTHDAY (YEARS)		6. DATE OF BIRTH (MONTH, DAY, YEAR)	
7b. CITY, TOWN, OR LOCATION OF DEATH		7c. INSIDE CITY LIMITS (SPECIFY YES OR NO)		7d. HOSPITAL OR OTHER INSTITUTION—NAME (IF NOT IN EITHER, GIVE STREET AND NUMBER)	
8. STATE OF BIRTH (IF NOT IN U.S.A., NAME COUNTRY)		9. CITIZEN OF WHAT COUNTRY		10. MARRIED, NEVER MARRIED, WIDOWED, DIVORCED (SPECIFY)	
11. SOCIAL SECURITY NUMBER		12. USUAL OCCUPATION (GIVE KIND OF WORK DONE DURING MOST OF WORKING LIFE, EVEN IF RETIRED)		13. KIND OF BUSINESS OR INDUSTRY	
14a. RESIDENCE—STATE		14b. COUNTY		14c. CITY, TOWN, OR LOCATION	
14d. INSIDE CITY LIMITS (SPECIFY YES OR NO)		14e. STREET AND NUMBER			
15. FATHER—NAME FIRST MIDDLE LAST			16. MOTHER—MAIDEN NAME FIRST MIDDLE LAST		
17a. INFORMANT—NAME			17b. MAILING ADDRESS (STREET OR R.F.D. NO., CITY OR TOWN, STATE, ZIP)		
PART I. DEATH WAS CAUSED BY: [ENTER ONLY ONE CAUSE PER LINE FOR (a), (b), AND (c)]					APPROXIMATE INTERVAL BETWEEN ONSET AND DEATH
18. IMMEDIATE CAUSE					
(a) DUE TO, OR AS A CONSEQUENCE OF:					
CONDITIONS, IF ANY, WHICH GAVE RISE TO IMMEDIATE CAUSE (a), STATING THE UNDERLYING CAUSE LAST					
(b) DUE TO, OR AS A CONSEQUENCE OF:					
(c)					
PART II. OTHER SIGNIFICANT CONDITIONS: CONDITIONS CONTRIBUTING TO DEATH BUT NOT RELATED TO CAUSE GIVEN IN PART I (a)					19a. AUTOPSY (YES OR NO)
					19b. IF YES WERE FINDINGS CONSIDERED IN DETERMINING CAUSE OF DEATH
20a. ACCIDENT, SUICIDE, HOMICIDE, OR UNDETERMINED (SPECIFY)		20b. DATE OF INJURY (MONTH, DAY, YEAR)		20c. HOUR M. 20d.	
20e. INJURY AT WORK (SPECIFY YES OR NO)		20f. PLACE OF INJURY AT HOME, FARM, STREET, FACTORY, OFFICE BLDG., ETC. (SPECIFY)		20g. LOCATION (STREET OR R.F.D. NO., CITY OR TOWN, STATE)	
21a. CERTIFICATION—PHYSICIAN: I ATTENDED THE DECEASED FROM		21b. TO		21c. AND LAST SAW HIM/HER ALIVE ON	
21d. MONTH DAY YEAR		21e. MONTH DAY YEAR		21f. I DID/DID NOT VIEW THE BODY AFTER DEATH.	
21g. CERTIFICATION—CORONER: ON THE BASIS OF THE EXAMINATION OF THE BODY AND/OR THE INVESTIGATION, IN MY OPINION, DEATH OCCURRED ON THE DATE AND DUE TO THE CAUSE(S) STATED.		21h. HOUR OF DEATH		21i. THE DECEDENT WAS PRONOUNCED DEAD	
		M. 21j.		MONTH DAY YEAR HOUR	
22a. CERTIFIER—NAME (TYPE OR PRINT)			22b. SIGNATURE		22c. DEGREE OR TITLE
22d. MAILING ADDRESS—CERTIFIER			22e. STREET OR R.F.D. NO.		22f. CITY OR TOWN
					22g. STATE
22h. ZIP					
23a. BURIAL, CREMATION, REMOVAL (SPECIFY)		23b. CEMETERY OR CREMATORY—NAME		23c. LOCATION	
23d. DATE (MONTH, DAY, YEAR)		23e. FUNERAL HOME—NAME AND ADDRESS (STREET OR R.F.D. NO., CITY OR TOWN, STATE, ZIP)		23f. CITY OR TOWN	
23g. FUNERAL DIRECTOR—SIGNATURE		23h. REGISTRAR—SIGNATURE		23i. DATE RECEIVED BY LOCAL REGISTRAR	
23j.		23k.		23l.	

DSHS 9-181 (6-73) (HEA 67) (Formerly S.F. 8191).

EXHIBIT 2 -- PMR Calculation

**Table B. COMPUTATION OF PROPORTIONATE MORTALITY RATIOS FOR TUBERCULOSIS, ALL FORMS, FOR WHITE MINERS: UNITED STATES, 1950**

$$\text{Proportionate mortality ratio} = \frac{\text{Tabulated deaths for an occupation-cause-color group}}{\text{Expected deaths for an occupation-cause-color group}} \times 100$$

Age	Percent tuberculosis deaths of all deaths all occupations (1)	Deaths from all causes for white miners (2)	Expected deaths from tuberculosis, all forms, for white miners (3) = (1) x (2)	Tabulated deaths from tuberculosis, all forms, for white miners (4)
20-24 years-----	6.28	292	18.34	10
25-29 years-----	8.30	357	29.63	20
30-34 years-----	9.01	341	30.72	22
35-44 years-----	7.78	1,095	85.19	98
45-54 years-----	5.19	1,784	92.59	174
55-59 years-----	3.68	1,554	57.19	112
60-64 years-----	2.77	2,051	56.81	104
Total:				
25-59 years-----	...	...	295.32	426
20-64 years-----	...	...	370.47	540

Proportionate mortality ratio      25-59 years =  $\frac{426}{295} \times 100 = 146$       20-64 years =  $\frac{540}{370} \times 100 = 144$

Reference: Guralnick, L. Mortality by Occupation and Cause of Death among Men 20-64 Years of Age: U.S. 1950. Vital Statistics--Special Reports, Vol. 53, No. 3, 1963.

EXHIBIT 3 -- Modified U.S. Census Bureau Occupational Code(16)

PROFESSIONAL, TECHNICAL AND KINDRED WORKERS

000	Accountants, auditors, assessors
007	atomic energy accountant
010	actors, actresses, radio announcers
011	air traffic controller
012	airplane pilots and navigators
013	architects
014	artists and art teachers
015	athletes, athletic coaches
016	chiropodist
020	authors
021	chemists
022	chiropractors
023	clergymen
030	college presidents and deans
031	professor/instructors, agricultural sciences
032	" " biological
034	" " chemistry
035	" " economics
040	" " engineering
041	" " geology and geophysics
042	" " mathematics
043	" " medical sciences
045	" " physics
050	" " psychology
051	" " statistics
052	" " natural sciences (NEC)
053	" " social sciences (NEC)
054	" " nonscientific subjects
055	" " forestry
060	" " subject not specified
070	dancers and dancing teachers
071	dentists
072	designers
073	dietitians and nutritionists
074	draftsmen
088	draftsmen, atomic energy
089	draftsmen, Boeing
075	editors and reporters
076	newspaper owners, publishers, managers, etc.
080	engineers, aeronautical
081	" chemical
082	" civil
083	" electrical
084	" industrial
085	" mechanical
086	" marine
087	" nuclear
090	" metallurgical
091	" mining
092	" sales
094	" construction

PROFESSIONAL, TECHNICAL AND KINDRED WORKERS

095 engineers, refrigeration  
096 " operating  
097 " Boeing  
099 " steam  
093 " (NEC), including aides  
101 entertainers (NEC)  
102 farm and home management advisers  
103 foresters and conservationists  
104 funeral directors and embalmers  
105 lawyers and judges  
106 court reporter  
111 librarians  
120 musicians and music teachers  
130 agricultural scientists  
131 biological scientists  
134 geologists and geophysicists  
135 mathematicians  
140 physicists  
141 meteorologists  
145 miscellaneous natural scientists  
150 nurses, professional  
151 nurses, student professional  
152 optometrists  
153 osteopaths  
154 personnel and labor relations workers  
160 pharmacists, druggists  
161 photographers  
162 physicians and surgeons  
163 public relations men and publicity writers  
164 radio operators  
165 recreation and group workers  
170 religious workers  
171 social and welfare workers, except group  
172 economists  
173 psychologists, psychiatrists  
174 statisticians and actuaries, analysts  
175 miscellaneous social scientists  
176 sanitarians  
180 sports instructors and officials  
181 surveyors  
182 teachers, elementary and secondary schools  
183 teachers, high school (NEC)  
184 teachers and administrators (NEC)  
185 technicians, medical and dental  
190 technicians, electrical and electronic  
191 technicians, other engineering and physical sciences  
192 technicians (NEC)  
193 therapists and healers (NEC)  
194 veterinarians  
195 professional, technical and kindred workers (NEC)  
196 student

FARMERS AND FARM MANAGERS

200 farmers (owners and tenants)  
201 orchardists  
202 nurseryman  
203 rancher, cattle, sheep, etc.  
204 dairy farmer  
205 wheat and grain farmer  
206 egg and poultry farmers-distributors  
207 bee keeper  
222 farm managers  
901 farm foreman  
902 farm laborers, wage workers  
903 unpaid family farm workers  
904 farm caretaker  
905 self-employed farm service  
906 itinerant laborer  
907 shepherd, wool worker, etc.  
724 tree farmer, forestry service, etc.  
983 orchard laborers, brush pickers  
964 landscaper, gardener, groundskeepers  
387 mink ranchers

MANAGERS, OFFICIALS, PROPRIETERS except farm

249 florists  
250 buyers and department heads, store  
251 buyers and shippers, farm products; produce brokers  
252 conductors, railroad  
253 credit men  
254 floor men and floor managers, store  
255 city, civil service employee  
260 inspectors, public administration  
261 lighthouse keeper  
262 managers and superintendents, building  
265 officers-pilots-pursers-engineers, ship  
270 officials and administrators (NEC), public administration  
275 officials, lodge, society, union, etc.  
280 postmasters  
285 purchasing agents and buyers (NEC), sales managers  
289 aircraft managers, etc.  
290 managers, officials and proprietors (NEC)  
291 fuel oil dealer, wholesale, clerical, gas service station  
tire re-cap, etc.  
292 lumber company manager, owner, etc.  
293 garage owner, foreman  
294 Boeing officials, managers, supervisors  
296 pet shop owner, worker  
297 furniture store owner, manager, clerks  
298 grocer, grocery clerks

### CLERICAL

301 agents (NEC)  
302 attendants and assistants, library  
303 attendants, physician's and dentist's offices  
304 baggagemen, transportation  
305 bankers, bank clerks, managers, etc.  
310 bookkeepers  
312 cashiers  
313 collectors, bill and account  
314 dispatchers and starters, vehicle; traffic managers  
320 file clerks  
321 adjusters, examiners, investigators, inspectors  
323 mail carriers  
324 messengers and office boys  
325 office machine operators  
333 payroll and timekeeping clerks  
340 postal clerks  
341 receptionists  
342 secretaries  
343 shipping and receiving clerks  
345 stenographers  
350 stock clerks and storekeepers  
351 telegraph messengers  
352 telegraph operators  
353 telephone operators  
354 ticket, station and express agents  
360 typists  
361 railroad clerks  
362 Boeing clerks  
363 public utility workers  
364 public utility supervisors and officials, etc.  
370 clerical and kindred workers (NEC)

### SALES WORKERS

380 travelling salesmen, sales representatives, advertising agents  
381 auctioneers  
382 demonstrators  
383 hucksters, peddlers, promoters  
384 lumber sales  
385 insurance agents, brokers, underwriters, appraisers  
386 car salesmen  
387 fur traders, mink ranchers, furriers  
388 chemical salesmen  
390 newsboys  
393 real estate agents, brokers, developers, appraisers  
395 stock and bond salesmen  
396 sales clerks (NEC)

CRAFTSMEN, FOREMEN AND KINDRED

400 carpet maker, carpet layers  
401 bakers  
402 blacksmiths  
403 boilermakers  
404 bookbinders  
405 brickmasons, stonemasons, tile setters  
406 building contractors, construction contractors  
407 boatbuilders  
408 railroad contractors  
409 shipwright  
410 cabinetmakers  
411 carpenters  
412 canvas makers, sailmakers, awning sales and service  
413 cement and concrete finishers  
414 compositors and typesetters  
415 cranemen, derrickmen and hoistmen  
416 oil drillers, well drillers  
420 decorators and window dressers  
421 electricians  
418 electricians, atomic energy  
419 electricians, Boeing or Airplane  
422 electricians, shipyard  
423 electrotypers and sterotypers  
424 engravers, except photoengravers  
425 excavating, grading, road machinery operators; pavers, highway  
maintenance  
427 railroad foremen  
429 construction foremen, etc (NEC)  
430 foremen (NEC)  
431 forgemen and hammermen  
434 glaziers  
435 smelter workers, heat treaters, annealers, temperers  
444 inspectors, scalers, graders-log and lumber; timber cruisers  
445 inspectors, machinery  
446 inspectors, Boeing  
447 inspectors, railroad  
448 inspectors, construction  
450 inspectors, NEC  
976 inspectors, fruit  
260 inspectors, public administration  
643 inspectors, manufacturing  
451 jewelers, watchmakers, goldsmiths, silversmiths, locksmiths  
452 jobsetters, metal  
453 linemen and servicemen, telegraph, telephone, power  
454 locomotive engineers (railroad)  
455 logging engineers  
460 locomotive firemen  
461 military machinist  
462 manufacturing  
464 logging machinist or mechanic  
465 machinist (NEC)  
466 machinists, Boeing  
467 machinists, shipyard

CRAFTSMEN, FOREMEN AND KINDRED continued

468 maintenance, Boeing  
469 maintenance, railroad  
476 maintenance, lumber, plywood, veneer, etc.  
470 mechanics and repairmen, air conditioning, heating, refrigeration  
471 " " airplane  
472 " " automobile  
473 " " office machines  
474 " " radio, television (manufacturing, etc.)  
475 " " railroad and car shop  
480 " " NEC  
490 millers; grain, flour, feed, etc.  
491 millwrights  
492 molders, metal  
493 motion picture projectionists  
494 opticians, and lens grinders and polishers  
495 painters, construction and maintenance  
496 county-city road construction and maintenance  
500 paper, pulp mill workers  
501 paperhangers and decorators (painters)  
502 pattern and model makers, except paper  
504 piano and organ tuners and repairmen  
505 plasterers and lathers  
507 shipyard workers, shipfitters  
508 steamfitter  
509 atomic steam fitters, pipefitters, etc.  
510 plumbers and pipefitters  
512 pressmen and plate printers, printing  
513 rollers and roll hands, metal  
514 roofers and slaters  
515 shoemakers and repairers (except factory), leather workers, tanners  
520 stationary engineers  
521 stonecutters and stone carvers  
523 structural metal workers  
524 tailors and tailoresses  
525 tinsmiths, coppersmiths and sheet metal workers  
526 aluminum workers  
527 cannery and food processing  
528 floor workers (covering, waxing, hardwood, linoleum, etc.)  
530 tool and die makers and setters, toolmakers, etc.  
535 upholsterers  
545 craftsmen and kindred workers (NEC)  
548 officers and enlisted men, Coast Guard  
549 " " Marine Corps  
550 " " Airforce  
551 " " Navy  
552 " " Army  
555 " " Armed Forces NEC  
553 Merchant Marine  
554 civilian employees of the armed forces  
557 Boeing workers NEC  
558 atomic energy workers NEC

## OPERATIVES

601 apprentice, auto mechanics  
602 " bricklayers and masons  
604 " electricians  
605 " machinists and toolmakers  
610 " mechanics, except auto  
612 " plumbers and pipefitters  
613 " building trades NEC  
614 " metalworking trades NEC  
615 " printing trades  
620 " other specified trades  
621 " trade not specified  
630 asbestos and insulation workers  
631 assemblers  
632 attendants, auto service, parking, gas station  
634 blasters and powdermen  
635 boatmen, canalmen and lock keepers  
640 railroad brakemen, carmen  
641 bus drivers  
642 chainmen, rodmen and axmen, surveying  
643 checkers, examiners and inspectors; manufacturing  
645 conductors, bus and street railway  
650 deliverymen and routemen  
651 dressmakers and seamstresses, except factory  
652 dyers  
653 filers, grinders and polishers; metal  
654 fruit, nut, vegetable; graders and packers, except factory  
655 creamery, ice cream mfg., dairymen and cheesemakers  
656 milk route delivery men  
657 Boeing parts finishers  
670 furnacemen, smeltermen and pourers  
671 heaters, metal  
673 knitters, loopers and toppers, etc.  
674 laundry and drycleaning operatives  
675 meat cutters, except slaughter and packing house  
676 heavy equipment  
677 slaughter house (etc.) butchers  
680 milliners  
685 mine operatives and laborers NEC  
690 motormen, mine, factory, etc.  
691 motormen, street, subway, elevated railway  
692 oilers and greasers, except auto  
693 packers and wrappers NEC  
694 painters (except construction & maintenance) sign  
695 photographic process workers  
701 power station operators  
702 divers  
703 sailors and deck hands, seamen NEC  
704 sawyers, sawmill workers and saw filers  
705 sewers and stitchers, manufacturing & cutters  
706 plywood workers  
710 spinners, textile  
711 rope makers

OPERATIVES continued

712 stationary firemen  
713 railroad switchmen  
714 taxicab drivers and chauffeurs  
715 truck and tractor drivers  
716 fuel oil truck drivers  
717 sawmill truckers  
718 lumber and logging truck drivers  
719 moving-transfer-storage, workers and truck drivers  
720 weavers, textile  
721 welders and flame-cutters  
722 operatives and kindred workers NEC  
724 Forestry Service, Parks, etc.; lookout, game dept. workers, tree  
farmers  
725 sandblasters  
726 ordnance plant workers

SERVICE WORKERS except private household

810 attendants, hospital and institutions  
811 nursing home, convalescent ctr., hospital managers, owners, etc.  
812 attendants, professional and personal service NEC  
813 attendants, recreation and amusement (cardroom, poolhall, carnival)  
814 barbers  
815 bartenders  
816 cocktail bars, tavern--owners, operators, workers NEC  
817 restaurant and cafe owners, operators, workers, managers  
818 brewery workers  
819 hotel, motel, resort, apartment house, dude ranch; owners, managers, etc.  
820 boot blacks or shoe shine operators  
821 boarding and lodging house keepers  
824 charwomen and cleaners  
825 cooks, candy makers, chefs (except private household)  
826 dishwashers  
827 lumber camp cooks  
830 counter and fountain workers  
831 elevator operators  
832 housekeepers and stewards, except private household  
833 window cleaners, wall washers, etc.  
834 janitors, maintenance men, sextons  
835 kitchen workers, restaurant employees NEC except private household  
836 school custodian  
840 midwives  
841 porters  
842 practical nurses  
843 hairdressers and cosmetologists  
849 fumigation employees  
850 firemen and fire protection  
851 guards, watchmen and doorkeepers  
852 marshals and constables  
853 policemen and detectives  
854 sheriffs and bailiffs  
855 maintenance and watchmen, lumber and logging

SERVICE WORKERS except private household continued

856 atomic energy plants watchmen and guards  
860 watchmen, crossing and bridge tenders  
874 ushers, recreation and amusement  
875 waiters and waitresses  
890 service workers, except private household NEC  
891 garbage collectors  
892 junk dealers, second hand store workers, salvage NEC

LABORERS except farm and mine

960 carpenters helpers, except logging and mining  
962 fishermen and oystermen  
963 garage laborers, car washers and greasers  
964 gardeners (except farm), groundskeepers, greenskeepers, landscapers  
965 longshoremen and stevedores  
966 produce and seed, feed, grain company workers  
967 flour mill employees  
970 lumbermen, raftsmen, woodchoppers, lumberjack, woodsmen, loggers  
971 teamsters  
972 truck drivers helpers  
973 warehousemen NEC  
974 woodworkers (yardworkers), shingle weaver, sash-door, pole, mill  
workers, match co., furniture finishers  
975 fruit warehouse workers  
976 fruit inspectors  
980 laborers NEC  
981 railroad laborers NEC  
982 construction laborers NEC  
983 orchard laborers, brush pickers  
984 hod carriers  
985 chemical company employees  
986 pest control

UNEMPLOYED or UNEMPLOYABLE

997 institutionalized, retarded, disabled war veterans; non-employable  
998 unemployed  
999 not stated or unknown

EXHIBIT 4 -- OCCUPATION GROUPINGS

<u>Grouped Code</u>	<u>Occupation Code</u>	
000	000	Accountants, Auditors, Assessors
	135	Mathematicians
	174	Statisticians, Actuaries and Analysts
012	012	Airplane Pilots and Navigators
013	013	Architects
014	014	Artists and Art Teachers
021	021	Chemists
022	022	Chiropractors
023	023	Clergymen
060	060	Professors, Instructors
	031	Professors and Instructors, Agricultural Sciences
	032	Professors and Instructors, Biological
	034	Professors and Instructors, Chemistry
	035	Professors and Instructors, Economics
	040	Professors and Instructors, Engineering
	041	Professors and Instructors, Geology and Geophysics
	042	Professors and Instructors, Mathematics
	043	Professors and Instructors, Medical Sciences
	045	Professors and Instructors, Physics
	050	Professors and Instructors, Psychology
	051	Professors and Instructors, Statistics
	052	Professors and Instructors, Natural Sciences NEC
	053	Professors and Instructors, Social Sciences NEC
054	Professors and Instructors, Nonscientific subjects	
055	Professors and Instructors, Forestry	
071	071	Dentists
074	074	Draftsmen
075	075	Editors and Reporters
076	076	Newspaper Owners, Publishers, Managers
082	082	Engineers, Civil
083	083	Engineers, Electrical
085	085	Engineers, Mechanical

<u>Grouped Code</u>	<u>Occupation Code</u>	
093	093	Engineers
	080	Engineers, Aeronautical
	081	Engineers, Chemical
	084	Engineers, Industrial
	086	Engineers, Marine
	090	Engineers, Metallurgical
	091	Engineers, Mining
	092	Engineers, Sales
	094	Engineers, Construction
	095	Engineers, Refrigeration
	096	Engineers, Operating
	097	Engineers, Boeing
	099	Engineers, Steam
103	103	Foresters and Conservationists
104	104	Funeral Directors and Embalmers
105	105	Lawyers and Judges
120	120	Musicians and Music Teachers
152	152	Optometrists
154	154	Personnel and Labor Relations Workers
160	160	Pharmacists, Druggists
161	161	Photographers
	695	Photographic Process Workers
162	162	Physicians
	153	Osteopaths
164	164	Radio Operators
181	181	Surveyors
184	184	Teachers (Except Music and Art)
	182	Teachers, Elementary and Secondary Schools
	183	Teachers, High School, NEC
185	185	Technicians, Medical and Dental
194	194	Veterinarians
195	195	Professional and Technical Workers, NEC
196	196	Students

<u>Grouped Code</u>	<u>Occupation Code</u>	
200	200	Farmers (owners and Tenants) NEC
201	201	Orchardists
202	202	Nurserymen
203	203	Rancher, Cattle, Sheep, Etc.
204	204	Dairy Farmer
205	205	Wheat and Grain Farmer
206	206	Egg and Poultry Farmers, Distributors
249	249	Florists
250	250	Store Buyers and Department Heads
251	251	Buyers and Shippers, Farm Products, Produce Brokers
252	252	Railroad Conductors
253	253	Credit Men
255	255	City, Civil Service Employee
262	262	Managers and Superintendents, Building
270	270	Officials and Administrators NEC, Public Administration
275	275	Officials, Lodge, Society, Union, Etc.
280	280	Postmasters
285	285	Purchasing Agents and Buyers NEC, Sales Managers
290	290	Managers, Officials, and Proprietors NEC
292	292	Lumber Company Manager, Owner, Etc.
	384	Lumber Sales
297	297	Furniture Store Owner, Manager, Clerks
298	298	Grocer, Grocery Clerks
304	304	Baggagemen, Transportation

<u>Grouped Code</u>	<u>Occupation Code</u>	
305	305	Bankers, Bank Clerks, Managers, Etc.
310	310	Bookkeepers
	312	Cashiers
	333	Payroll and Timekeeping Clerks
314	314	Dispatchers and Starters, Vehicle, Traffic Managers
321	321	Adjusters, Examiners, Investigators, Inspectors
323	323	Mail Carriers
340	340	Postal Clerks
343	343	Shipping and Receiving Clerks
350	350	Stock Clerks, Storekeepers
	973	Warehousemen
352	352	Telegraph and Radio Operators
	164	Radio Operators
354	354	Ticket, Station and Express Agents
363	363	Public Utility Workers
	364	Public Utility Supervisors and Officials, Etc.
370	370	Clerical and Kindred Workers NEC
380	380	Travelling Salesmen, Sales Representatives, Advertising Agents
	382	Demonstrators
	383	Hucksters, Peddlers, Promoters
385	385	Insurance Agents, Brokers, Underwriters, Appraisers
386	386	Car Salesmen
387	387	Fur Traders, Mink Ranchers, Furriers
390	390	Newsboys
393	393	Real Estate Agents, Brokers, Developers, Appraisers
395	395	Stock and Bond Salesmen

<u>Grouped Code</u>	<u>Occupation Code</u>	
396	396	Sales Clerks NEC
400	400	Carpet Maker, Carpet Layers
401	401	Bakers
402	402	Blacksmiths
403	403	Boilermakers
405	405 602	Brickmasons, Stonemasons, Tile Setters Apprentice Bricklayers and Masons
406	406 429 613	Building Contractors, Construction Contractors Construction Foremen, etc. NEC Apprentice Building Trades NEC
407	407	Boatbuilders
411	411 410 960	Carpenters Cabinetmakers Carpenters Helpers, Except Logging and Mining
412	412 652 673 705 710 711 720	Canvas Makers and Fabric Workers Dyers Knitters, Loopers and Toppers Sewers, Stitchers and Cutters, Manufacturing Spinners, Textile Rope Makers Weavers, Textile
413	413	Cement and Concrete Finishers
415	415	Cranemen, Derrickmen and Hoistmen
416	416	Oil drillers, Well Drillers
420	420	Decorators, Window Dressers
421	421 190 419 604	Electricians Technicians, Electrical and Electronic Electricians, Boeing or Airplane Apprentice Electricians
425	425 496 676	Excavating, Grading, Road Machinery Operators, Pavers, Highway Maintenance County and City Road Construction and Maintenance Workers Heavy Equipment Operators
430	430	Foremen NEC

<u>Grouped Code</u>	<u>Occupation Code</u>	
434	434	Glaziers
435	435	Smelter Workers, Heat Treaters, Annealers, Temperers
	431	Forgemen and Hammermen
	670	Furnacemen, Smeltermen and Pourers
	671	Heaters, Metal
	672	Other Smelter Workers
444	444	Inspectors, Scalers, Graders-Log and Lumber, Timber Cruisers
450	450	Inspectors
	445	Inspectors, Machinery
	448	Inspectors, Construction
	643	Checkers, Examiners and Inspectors, Manufacturing
451	451	Jewelers, Watchmakers, Goldsmiths, Silversmiths, Locksmiths
453	453	Linemen and Servicemen, Telegraph, Telephone, Power
454	454	Locomotive Engineer
460	460	Locomotive Firemen
462	462	Manufacturing Workers
465	465	Machinist NEC
	461	Military Machinist
	605	Apprentice Machinists and Toolmakers
469	469	Railroad Workers, NEC
	361	Railroad Clerks
	408	Railroad Contractors
	427	Railroad Foremen
	447	Railroad Inspectors
	713	Railroad Switchmen
	981	Railroad Laborers NEC
472	472	Mechanics and Repairmen, Automobile
	601	Apprentice Auto Mechanics
476	476	Lumber, Plywood, Veneer, Maintenance Workers NEC

<u>Grouped Code</u>	<u>Occupation Code</u>	
480	480	Mechanics and Repairmen
	470	Mechanics and Repairmen, Air Conditioning, Heating, Refrigeration
	471	Mechanics and Repairmen, Airplane
	473	Mechanics and Repairmen, Office Machines
	474	Mechanics and Repairmen, Radio, Television (Manufacturing, Etc.)
	475	Mechanics and Repairmen, Railroad and Car Shop
	610	Apprentice Mechanics, Except Auto
490	490	Millers, Grain, Flour, Feed, Etc.
	967	Flour Mill Employees
491	491	Millwrights
492	492	Moulders, Metal
493	493	Motion Picture Projectionists
500	500	Paper, Pulp Mill Workers
501	501	Paper Hangers and Decorators (Painters)
502	502	Pattern and Model Makers, Except Paper
505	505	Plasterers and Lathers
507	507	Shipyard Workers, Shipfitters
	409	Shipwrights
	422	Electricians, Shipyard
	467	Machinists, Shipyard
510	510	Plumbers and Pipefitters
	508	Steamfitters
	612	Apprentice Plumbers and Pipefitters
512	512	Pressmen and Plate Printers, Printing
	414	Compositors and Typesetters
	423	Electrotypers and Sterotypers
	615	Apprentice Printing Trades
514	514	Roofers and Slaters
515	515	Shoemakers and Repairers (Except Factory), Leather Workers, Tanners

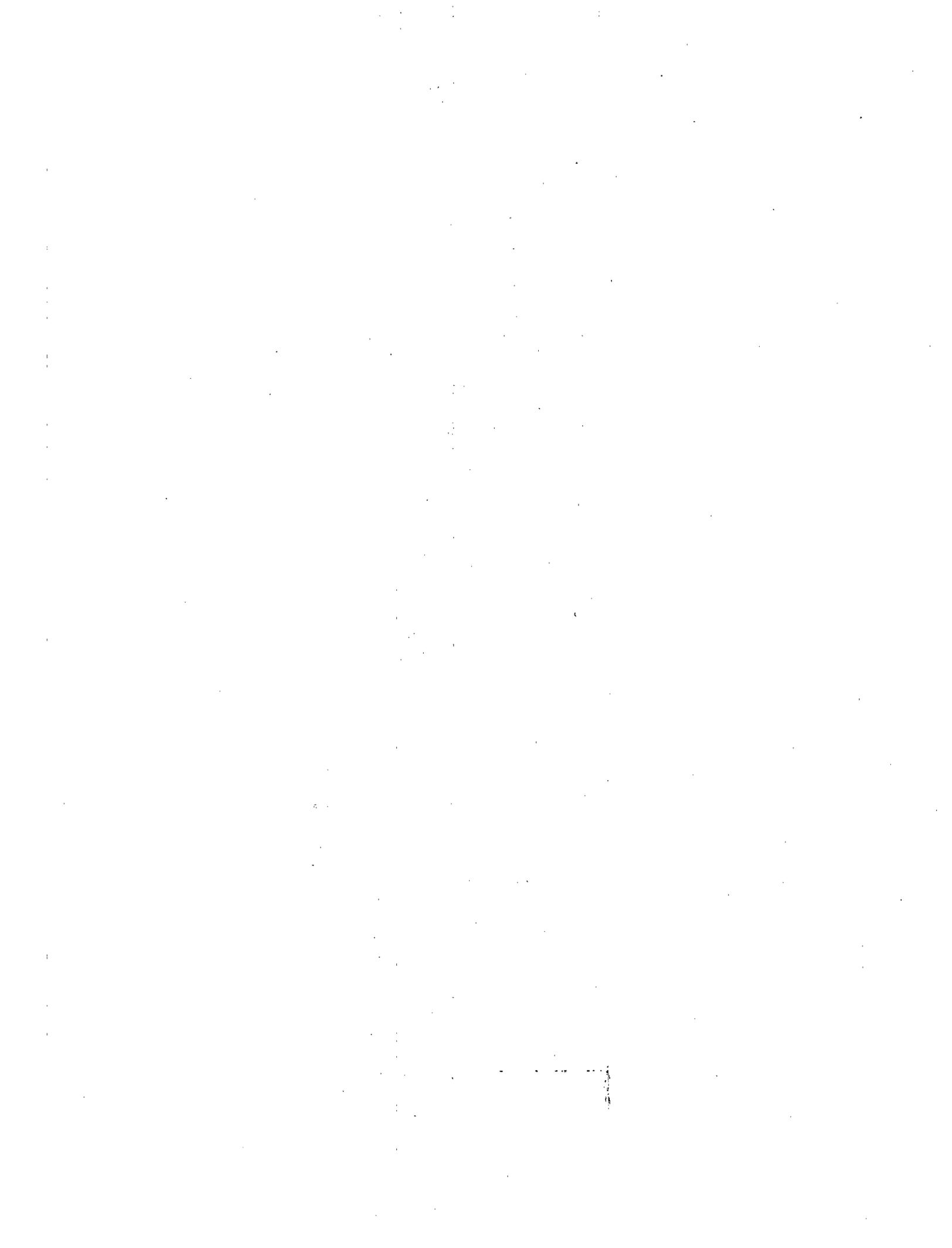
<u>Grouped Code</u>	<u>Occupation Code</u>	
520	520	Stationary Engineers
	701	Power Station Operators
	712	Stationary Firemen
521	521	Stonecutters and Stone Carvers
523	523	Structural Metal Workers
	452	Jobsetters, Metal
	614	Apprentice Metalworking Trades NEC
	653	Filers, Grinders and Polishers, Metal
524	524	Tailors
525	525	Tinsmiths, Coppersmiths and Sheet Metal Workers
	513	Rollers and Roll Hands, Metal
526	526	Aluminum Workers
527	527	Cannery and Food Processing Workers
528	528	Floor Workers (Covering, Waxing, Hardwood, Linoleum, Etc.)
530	530	Tool and Die Makers and Setters, Toolmakers, Etc.
535	535	Upholsterers
545	545	Craftsmen and Kindred Workers NEC
551	551	Officers and Enlisted Men, Navy
	548	Officers and Enlisted Men, Coast Guard
555	555	Officers and Enlisted Men, Armed Forces NEC
	549	Officers and Enlisted Men, Marine Corps
	550	Officers and Enlisted Men, Airforce
	552	Officers and Enlisted Men, Army
557	557	Boeing Workers
	089	Draftsmen, Boeing
	294	Boeing Officials, Managers, Supervisors
	362	Boeing Clerks
	446	Boeing Inspectors
	466	Boeing Machinists
	468	Maintenance Workers, Boeing
	657	Boeing Parts Finishers

<u>Grouped Code</u>	<u>Occupation Code</u>	
558	558	Atomic Energy Workers NEC
	007	Atomic Energy Accountants
	087	Engineers, Nuclear
	088	Draftsmen, Atomic Energy
	418	Electricians, Atomic Energy
	509	Atomic Steam Fitters, Pipefitters, Etc.
	856	Atomic Energy Plants Watchmen and Guards
630	630	Asbestos and Insulation Workers
632	632	Attendants, Auto Service, Parking, Gas Station
	291	Fuel Oil Dealer, Wholesale, Clerical, Gas Station, Tire Recap
	293	Garage Owner, Foremen
	963	Garage Laborers, Car Washers and Greasers
634	634	Blasters and Powdermen
640	640	Railroad Brakemen
641	641	Bus Drivers
645	645	Conductors, Bus and Street Railway
650	650	Deliverymen and Routemen
655	655	Creamery, Ice Cream and Cheese Makers, Dairymen
656	656	Milk Route Delivery Men
674	674	Laundry and Drycleaning Operatives
675	675	Meatcutters and Butchers
	677	Slaughter House Butchers
685	685	Mine Operatives and Laborers NEC
691	691	Motormen, Street, Subway, Elevated Railway
692	692	Oilers and Greasers, Except Auto
693	693	Packers and Wrappers NEC
694	694	Painters
	495	Painters, Construction and Maintenance

<u>Grouped Code</u>	<u>Occupation Code</u>	
703	703	Sailors and Deck Hands, Seamen NEC
	265	Officers, Pilots, Purser, Engineers, Ship
	553	Merchant Marine
704	704	Sawyers, Sawmill Workers and Saw Filers
706	706	Plywood Workers
714	714	Taxicab Drivers and Chauffeurs
715	715	Truck and Tractor Drivers
	717	Sawmill Truckers
	718	Lumber and Logging Truck Drivers
	719	Moving, Transfer and Storage Workers and Truck Drivers
	971	Teamsters
	972	Truck Driver Helpers
716	716	Fuel Oil Truck Drivers
721	721	Welders and Flame-Cutters
722	722	Operatives and Kindred Workers NEC
724	724	Forest Service, Game Department Workers
	723	Tree Farmer, Forestry Service
726	726	Ordnance Plant Workers
810	810	Attendants, Hospital and Institutions
813	813	Attendants, Recreation and Amusement (Cardroom, Poolhall, Carnival)
	165	Recreation and Group Workers
814	814	Barbers
815	815	Bartenders
	816	Cocktail Bar, Tavern Owners, Operators, Workers NEC
817	817	Restaurant and Cafe Owners, Operators, Workers, Managers
818	818	Brewery Workers
819	819	Hotel, Motel, Resort, Apartment House, Dude Ranch Owners and Managers

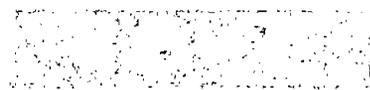
<u>Grouped Code</u>	<u>Occupation Code</u>	
820	820	Boot Blacks or Shoe Shine Operators
825	825	Cooks, Candy Makers, Chefs (Except Private Household)
	827	Lumber Camp Cooks
	835	Kitchen Workers, Restaurant Employees NEC, Except Private Household
826	826	Dishwashers
831	831	Elevator Operators
832	832	Housekeepers and Stewards, Except Private Household
833	833	Window Cleaners, Wall Washers, Etc.
834	834	Janitors, Maintenance Men, Sextons
	836	School Custodian
841	841	Porters
850	850	Firemen and Fire Protection
851	851	Guards, Watchmen and Doorkeepers
853	853	Policemen and Detectives
	852	Marshals and Constables
	854	Sheriffs and Bailiffs
875	875	Waiters
891	891	Garbage Collectors
892	892	Junk Dealers, Second Hand Store Workers, Salvage NEC
902	902	Farm Laborers, Wage Workers
	222	Farm Managers
	901	Farm Foremen
	903	Unpaid Family Farm Workers
	904	Farm Caretaker
	905	Self-Employed Farm Service
	906	Itinerant Laborer
907	907	Shepherd, Wool Worker, Etc.
962	962	Fishermen and Oystermen

<u>Grouped Code</u>	<u>Occupation Code</u>	
964	964	Gardeners (Except Farm), Groundskeepers, Greenskeepers, Landscapers
965	965	Longshoremen and Stevedores
966	966	Produce, Seed, Feed, and Grain Company Workers
970	970	Loggers
	455	Logging Engineers
	464	Logging Machinist or Mechanic
	855	Maintenance and Watchmen, Lumber and Logging
974	974	Woodworkers: Mill, Furniture, Match, Yardworker: Shingle Weaver
	476	Maintenance-Lumber, Plywood, Veneer, etc.
975	975	Fruit Warehouse Workers
980	980	Laborers
	984	Hod Carriers
982	982	Construction Laborers NEC
983	983	Orchard Laborers
985	985	Chemical Company Employees
997	997	Institutionalized, Retarded, Disabled War Veterans, Non-Employable
999	999	Not Stated or Unknown
	998	Unemployed



ALPHABETICAL INDEX OF OCCUPATIONS

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ALPHABETICAL INDEX OF OCCUPATIONS

Grouped Code (Column 2) supersedes Occupation Code (Column 1) when listed. An asterisk (\*) indicates that no occupational mortality table is printed (data available on request).

A	Occupation Code	Grouped Code	Commentary Page
Accountants.....	000	---	5
Accountants, atomic energy.....	007	558	29
Actors.....	010*	---	--
Actuaries.....	174	000	5
Administrators, school.....	184	---	10
Administrators, public.....	270	---	14
Adjusters.....	321	---	--
Advertising agents.....	380	---	17
Advisers, farm and home management.....	102*	---	--
Aeronautical engineers.....	080	093	8
Agents, advertising.....	380	---	17
Agents, express.....	354	---	17
Agents, insurance.....	385	---	17
Agents NEC.....	301	---	--
Agents, purchasing.....	285	---	14
Agents, real estate.....	393	---	18
Agents, station and ticket.....	354	---	17
Agricultural science professors.....	031	060	7
Agricultural scientists.....	130*	---	--
Air conditioning repairmen.....	470	480	24
Aircraft managers.....	289*	---	--
Airforce officers and enlisted men.....	550	555	29
Airplane electricians.....	419	421	21
Airplane mechanics.....	471	480	24
Airplane navigators.....	012	---	5
Airplane pilots.....	012	---	5
Air traffic controllers.....	011*	---	--
Aluminum workers.....	526	---	28
Amusement attendants (cardroom, poolhall, carnival).....	813	---	40
Analysts.....	174	000	5
Annealers.....	435	---	21
Announcers, radio.....	010*	---	--
Apartment house owners and managers.....	819	---	37
Appraisers, insurance.....	385	---	17
Appraisers, real estate.....	393	---	18
Apprentice automobile mechanics.....	601	472	23
Apprentice bricklayers and masons.....	602	405	19
Apprentice electricians.....	604	421	21
Apprentice machinists and toolmakers.....	605	465	23
Apprentice mechanics except automobile.....	610	480	24
Apprentice plumbers and pipefitters.....	612	510	26
Apprentices, building trades NEC.....	613	406	19
Apprentices, metalworking trades NEC.....	614	523	27
Apprentices, other specified trades.....	620*	---	--
Apprentices, printing trades.....	615	512	26
Apprentices, trade not specified.....	621*	---	--

	Occupation Code	Grouped Code	Commentary Page
Architects.....	013	---	5
Armed Forces civilian employees.....	554*	---	--
Armed Forces officers and enlisted men NEC...	555	---	29
Army officers and enlisted men.....	552	555	29
Artists.....	014	---	5
Art teachers.....	014	---	5
Asbestos workers.....	630	---	30
Assemblers.....	631	---	--
Assessors.....	000	---	5
Assistants, library.....	302*	---	--
Athletes.....	015*	---	--
Atomic energy accountants.....	007	558	29
Atomic energy draftsmen.....	088	558	29
Atomic energy electricians.....	418	558	29
Atomic energy plant watchmen and guards.....	856	558	29
Atomic energy steamfitter, pipefitter.....	509	558	29
Atomic energy workers NEC.....	558	---	29
Attendants, hospital and institution.....	810	---	35
Attendants, library.....	302*	---	--
Attendants, physicians and dentists offices..	303*	---	--
Attendants, professional and personal serv- ice NEC.....	812*	---	--
Attendants, recreation and amusement.....	813	---	--
Auctioneers.....	381*	---	--
Auditors.....	000	---	5
Authors.....	020*	---	--
Automobile greasers and washers.....	963	632	30
Automobile mechanic apprentices.....	601	472	23
Automobile mechanics.....	472	---	23
Automobile service attendants.....	632	---	30
Awning sales and service.....	412	---	20
Axmen, surveying.....	642*	---	--

B

Baggagemen.....	304	---	--
Bailiffs and sheriffs.....	854	853	38
Bakers.....	401	---	18
Bankers, bank clerks and managers.....	305	---	15
Barbers.....	814	---	36
Bartenders.....	815	---	36
Beekeepers.....	207*	---	--
Biological science professors.....	032	060	7
Biological scientists.....	131*	---	--
Blacksmiths.....	402	---	19
Blasters and powdermen.....	634	---	30
Boarding and lodging house keepers.....	821*	---	--
Boatbuilders.....	407	---	19

	Occupation Code	Grouped Code	Commentary Page
Boatmen.....	635*	---	--
Boeing clerks.....	362	557	29
Boeing draftsmen.....	089	557	29
Boeing electricians.....	419	421	21
Boeing engineers.....	097	093	8
Boeing inspectors.....	446	557	29
Boeing machinists.....	466	557	29
Boeing maintenance.....	468	557	29
Boeing managers.....	294	557	29
Boeing officials.....	294	557	29
Boeing parts finishers.....	657	557	29
Boeing supervisors.....	294	557	29
Boeing workers NEC.....	557	---	29
Boilermakers.....	403	---	19
Bond salesmen.....	295*	---	--
Bookbinders.....	404*	---	--
Bookkeepers.....	310	---	15
Boot blacks.....	820	---	--
Brakemen, railroad.....	640	---	31
Brewery workers.....	818	---	36
Bricklayer apprentices.....	602	405	19
Brickmason.....	405	---	19
Bridge tenders.....	860*	---	--
Brokers, insurance.....	385	---	17
Brokers, produce and farm products.....	251	---	13
Brokers, real estate.....	393	---	18
Brush pickers.....	983	---	41
Building contractors.....	406	---	19
Building trades (NEC) apprentices.....	613	406	19
Bus and Street railway conductors.....	645	---	--
Bus drivers.....	641	---	31
Butchers, slaughter house.....	677	675	32
Buyers, farm products.....	251	---	--
Buyers NEC.....	285	---	14
Buyers, store.....	250	---	13

C

Cabinetmakers.....	410	411	20
Cafe and restaurant owners and managers.....	817	---	36
Canalmen.....	635*	---	--
Candymakers and cooks.....	825	---	37
Cannery workers.....	527	---	28
Canvasmakers.....	412	---	20
Caretaker, farm.....	904	902	39
Carmen, railroad.....	640	---	31
Carpenters.....	411	---	20
Carpenters helpers, except logging & mining.....	960	411	20

	Occupation Code	Grouped Code	Commentary Page
Carpet layer.....	400	---	--
Carpet maker.....	400	---	--
Car salesmen.....	386	---	18
Cashiers.....	312	310	15
Cement finishers.....	413	---	20
Chainmen, surveying.....	642*	---	--
Chauffeurs.....	714	---	34
Checkers, manufacturing.....	643	450	--
Cheesemakers.....	655	---	31
Chemical company employees.....	985	---	--
Chemical engineers.....	081	093	8
Chemical salesmen.....	388*	---	--
Chemistry professors.....	034	060	7
Chemists.....	021	---	6
Chiropodists.....	016*	---	--
Chiropractors.....	022	---	6
City employees.....	255	---	14
Civil engineers.....	082	---	8
Civil service employees.....	255	---	14
Cleaners.....	824*	---	--
Clergymen.....	023	---	6
Clerical NEC.....	370	---	--
Clerks, bank.....	305	---	15
Clerks, Boeing.....	362	557	29
Clerks, file.....	320*	---	--
Clerks, furniture store.....	297	---	15
Clerks, grocery store.....	298	---	15
Clerks, payroll and timekeeping.....	333	310	15
Clerks, postal.....	340	---	16
Clerks, railroad.....	361	469	23
Clerks, sales NEC.....	396	---	18
Clerks, shipping and receiving.....	343	---	16
Clerks, stock.....	350	---	16
Coaches, athletic.....	015*	---	--
Coast guard officers and enlisted men.....	548	551	29
Cocktail bar owners and operators.....	816	815	38
Collectors, bill and account.....	313*	---	--
College presidents and deans.....	030*	---	--
Compositors.....	414	512	26
Concrete finishers.....	413	---	20
Conductors, bus and street railway.....	645	---	--
Conductors, railroad.....	252	---	13
Conservationists.....	103	---	8
Constables and marshals.....	852	853	38
Construction contractors.....	406	---	19
Construction, county-city roads.....	496	425	21
Construction engineers.....	094	093	8
Construction foremen.....	429	406	19
Construction inspectors.....	448	450	--

	Occupation Code	Grouped Code	Commentary Page
Construction laborers NEC.....	982	---	41
Contractors, building and construction.....	406	---	19
Contractors, railroad.....	408	469	23
Controllers, air traffic.....	011*	---	--
Cooks, chefs, candymakers.....	825	---	37
Cooks, lumber camp.....	827	825	37
Coppersmiths.....	525	---	27
Cosmetologists.....	843*	---	--
Court reporters.....	106*	---	--
Craftsmen NEC.....	545	---	29
Cranemen.....	415	---	20
Creamery workers.....	655	---	31
Credit men.....	253	---	13
Crossing watchmen.....	860*	---	--
Cutters and sewers, manufacturing.....	705	412	20

D

Dairy farmers.....	204	---	12
Dairy workers.....	655	---	31
Dancers.....	070*	---	--
Dancing teachers.....	070*	---	--
Deans, college.....	030*	---	--
Deck hands.....	703	---	33
Decorators (home interior).....	501	---	25
Decorators (window dressers).....	420	---	--
Deliverymen.....	650	---	31
Deliverymen, milk route.....	656	---	32
Demonstrators.....	382	380	17
Dental technicians.....	185	---	10
Dentists.....	071	---	7
Dentists office attendants.....	303*	---	--
Derrickmen.....	415	---	20
Designers.....	072*	---	--
Detectives and policemen.....	853	---	38
Developers, real estate.....	393	---	18
Dieticians.....	073*	---	--
Dishwashers.....	826	---	37
Dispatchers, vehicle.....	314	---	15
Distributers, egg and poultry.....	206	---	--
Divers.....	702*	---	--
Doorkeepers, guards and watchmen.....	851	---	--
Draftsmen.....	074	---	7
Draftsmen, atomic energy.....	088	558	29
Draftsmen, Boeing.....	089	557	29
Dressmakers, except factory.....	651*	---	--
Drivers, bus.....	641	---	31
Drivers, fuel oil truck.....	716	---	34

	Occupation Code	Grouped Code	Commentary Page
Drivers, lumber and log trucks.....	718	715	34
Drivers, moving and transfer trucks.....	719	715	34
Drivers, sawmill trucks.....	717	715	34
Drivers, taxicab.....	714	---	34
Drivers, truck and tractor.....	715	---	34
Druggists.....	160	---	9
Drycleaning operatives.....	674	---	32
Dyers.....	652	412	20

E

Economics professors.....	035	060	7
Economists.....	172*	---	--
Editors.....	075	---	7
Egg farmers.....	206	---	--
Electrical and electronic technicians.....	190	421	21
Electrical engineers.....	083	---	8
Electricians.....	421	---	21
Electricians apprentices.....	604	421	21
Electricians, atomic energy.....	418	558	29
Electricians, Boeing or Airplane.....	419	421	21
Electricians, shipyard.....	422	507	25
Electrotypers.....	423	512	26
Elevator operators.....	831	---	--
Embalmers.....	104	---	9
Engineering professors.....	040	060	7
Engineers, aeronautical.....	080	093	8
Engineers, Boeing.....	097	093	8
Engineers, chemical.....	081	093	8
Engineers, civil.....	082	---	8
Engineers, construction.....	094	093	8
Engineers, electrical.....	083	---	8
Engineers, industrial.....	084	093	8
Engineers, locomotive.....	454	---	22
Engineers, logging.....	455	970	40
Engineers, marine.....	086	093	8
Engineers, mechanical.....	085	---	8
Engineers, metallurgical.....	090	093	8
Engineers, mining.....	091	093	8
Engineers NEC (including aides).....	093	---	8
Engineers, nuclear.....	087	558	29
Engineers, operating.....	096	093	8
Engineers, refrigeration.....	095	093	8
Engineers, sales.....	092	093	8
Engineers, ship.....	265	703	33
Engineers, stationary.....	520	---	27
Engineers, steam.....	099	093	8
Engravers.....	424*	---	--

	Occupation Code	Grouped Code	Commentary Page
Entertainers.....	101*	---	--
Examiners.....	321	---	--
Examiners, manufacturing.....	643	450	--
Excavating machine operators.....	425	---	21
Express agents.....	354	---	17

F

Factory motormen.....	690*	---	--
Farm caretakers.....	904	902	39
Farmers, bee.....	207*	---	--
Farmers, cattle.....	203	---	12
Farmers, dairy.....	204	---	12
Farmers, egg.....	206	---	13
Farmers, grain.....	205	---	12
Farmers, mink.....	387	---	--
Farmers, nursery.....	202	---	12
Farmers, poultry.....	206	---	13
Farmers, sheep.....	203	---	12
Farmers, tree.....	724	---	35
Farmers, wheat.....	205	---	12
Farm foremen.....	901	902	39
Farm laborers.....	902	---	39
Farm laborers, itinerant.....	906	902	39
Farm laborers, orchard.....	983	---	39
Farm managers.....	222	902	39
Farm management advisers.....	102*	---	--
Farm owners.....	200	---	14
Farm products buyers and shippers.....	251	---	13
Farm service (self-employed).....	905	902	39
Farm workers, family.....	903	902	39
File clerks.....	320	---	--
Filers, metal.....	653	523	27
Firemen and fire protection.....	850	---	38
Firemen, locomotive.....	460	---	23
Firemen, stationary.....	712	520	27
Fishermen.....	962	---	39
Flame cutters.....	721	---	35
Floor covering.....	528	---	28
Floor men and floor managers, store.....	254*	---	--
Florists.....	249	---	13
Flour mill employees.....	967	490	24
Food processing workers.....	527	---	28
Foremen, construction.....	429	406	19
Foreman, farm.....	901	902	39
Foreman, garage.....	293	632	30
Foremen NEC.....	430	---	--
Foremen, railroad.....	427	469	23

	Occupation Code	Grouped Code	Commentary Page
Foresters.....	103	---	8
Forestry professors.....	055	060	7
Forestry service workers and lookouts.....	724	---	35
Forgemen.....	431	435	21
Fountain and counter workers.....	830*	---	--
Fruit and nut graders and packers.....	654*	---	--
Fruit inspectors.....	976*	---	--
Fruit warehouse workers.....	975	---	40
Fuel oil dealers.....	291	632	30
Fuel oil truck drivers.....	716	---	34
Fumigation workers.....	849*	---	--
Funeral directors.....	104	---	9
Furnacemen.....	670	435	21
Furniture finishers.....	974	---	40
Furniture store owner, manager, clerks.....	297	---	15
Furriers.....	387	---	--
Fur traders.....	387	---	--

G

Game department workers.....	724	---	35
Garage laborers, car washers.....	963	632	30
Garage owners.....	293	632	30
Garbage collectors.....	891	---	38
Gardeners (except farm).....	964	---	39
Gas service station attendants.....	632	--	30
Gas service station dealer.....	291	632	30
Geologists and geophysicists.....	134*	---	--
Geology and geophysics professors.....	041	060	7
Glaziers.....	434	---	21
Goldsmiths.....	451	---	22
Grader operators.....	425	---	21
Graders, log and lumber.....	444	---	22
Grain and feed company workers.....	966	---	--
Grain farmer.....	205	---	12
Grain, flour and feed millers.....	490	---	24
Greasers, automobile.....	963	632	30
Greasers, except automobile.....	692	---	33
Greenskeepers.....	964	---	39
Grinders, metal.....	653	523	27
Grocers.....	298	---	15
Groundskeepers.....	964	---	39
Group workers.....	165	813	36
Guards, atomic energy plant.....	856	558	29
Guards, watchmen and doorkeepers.....	851	---	38

H	Occupation Code	Grouped Code	Commentary Page
Hairdressers.....	843*	---	--
Hammermen.....	431	435	21
Hardwood floor workers.....	528	---	28
Healers.....	193*	---	--
Heaters, metal.....	671	435	21
Heating repairmen.....	470	480	24
Heat treaters.....	435	---	21
Heavy equipment operators.....	676	425	21
Highway maintenance.....	425	---	21
Hod carriers.....	984	980	40
Hoistmen.....	415	---	20
Home management advisers.....	102*	---	--
Hospital attendants.....	810	---	35
Hospital managers.....	811*	---	--
Hotel owners and managers.....	819	---	37
Housekeepers and stewards.....	832	---	--
Hucksters.....	383	380	17

### I

Ice cream manufacturers.....	655	---	31
Industrial engineers.....	084	093	8
Inspectors.....	321	---	--
Inspectors, Boeing.....	446	557	29
Inspectors, construction.....	448	450	--
Inspectors, fruit.....	976*	---	--
Inspectors, log and lumber.....	444	---	22
Inspectors, machinery.....	445	450	--
Inspectors, manufacturing.....	643	450	--
Inspectors NEC.....	450	---	--
Inspectors, public administration.....	260*	---	--
Inspectors, railroad.....	447	469	23
Institution Attendants.....	810	---	35
Institutionalized.....	997	---	41
Instructor, sports.....	180*	---	--
Insulation workers.....	630	---	30
Insurance agents, appraisers, brokers and underwriters.....	385	---	17
Investigators.....	321	---	--

### J

Janitors.....	834	---	37
Janitors, school.....	836	834	37
Jewelers.....	451	---	22
Jobsetters, metal.....	452	523	27
Judges.....	105	---	9
Junk dealers.....	892	---	--

	Occupation Code	Grouped Code	Commentary Page
K			
Kitchen workers and restaurant employees NEC	835	825	37
Knitters.....	673	412	20
L			
Laborers, construction NEC.....	982	---	41
Laborers, farm.....	902	---	39
Laborers, garage.....	963	632	30
Laborers, itinerant farm.....	906	902	39
Laborers, mine.....	685	---	32
Laborers NEC.....	980	---	40
Laborers, orchard.....	983	---	41
Laborers, railroad NEC.....	981	469	23
Labor relations workers.....	154	---	--
Landscapers.....	964	---	39
Lathers.....	505	---	25
Laundry operatives.....	674	---	32
Lawyers.....	105	---	9
Leather workers.....	515	---	26
Lens grinders and polishers.....	494*	---	--
Librarians.....	111*	---	--
Library attendants and assistants.....	302*	---	--
Lighthouse keepers.....	261*	---	--
Linemen, telephone, telegraph and power.....	453	---	22
Linoleum floor coverers.....	528	---	28
Lock keepers.....	635*	---	--
Locksmiths.....	451	---	22
Locomotive engineers.....	454	---	22
Locomotive firemen.....	460	---	23
Lodge officials.....	275	---	14
Lodging house keepers.....	821*	---	--
Log and lumber inspectors, scalers, graders.	444	---	22
Loggers.....	970	---	40
Logging engineers.....	455	970	40
Logging machinist or mechanic.....	464	970	40
Log truck drivers.....	718	715	34
Longshoremens.....	965	---	39
Loopers.....	673	412	20
Lumber and logging maintenance and watchmen.	855	970	40
Lumber camp cooks.....	827	825	37
Lumber company owners, managers.....	292	---	14
Lumberjacks (loggers).....	970	---	40
Lumbermen (loggers).....	970	---	40
Lumber, plywood, veneer maintenance.....	476	974	40
Lumber sales.....	384	292	14
Lumber truck drivers.....	718	715	34
Lumber yardworkers.....	974	---	40

M	Occupation Code	Grouped Code	Commentary Page
Machinery inspectors.....	445*	450	--
Machinists apprentices.....	605	465	23
Machinists, Boeing.....	466	557	29
Machinists, logging.....	464	970	40
Machinists, military.....	461	465	23
Machinists NEC.....	465	---	23
Machinists, shipyard.....	467	507	25
Mail carriers.....	323	---	16
Maintenance, Boeing.....	468	557	29
Maintenance, highway.....	425	---	21
Maintenance; lumber, plywood and veneer....	476	974	40
Maintenance, lumber and logging.....	855	970	40
Maintenance men.....	834	---	37
Maintenance, railroad.....	469	---	23
Managers, bank.....	305	---	15
Managers, Boeing.....	294	557	29
Managers, building.....	262	---	--
Managers, cocktail bars and tavern.....	816	815	36
Managers, farm.....	222	902	39
Managers, furniture store.....	297	---	15
Managers, hospitals and nursing homes.....	811*	---	--
Managers; hotel, motel, resort and apartment house.....	819	---	37
Managers, lumber company.....	292	---	14
Managers NEC.....	290	---	--
Managers, newspaper.....	076	---	7
Managers, restaurant and cafe.....	817	---	36
Managers, sales.....	285	---	14
Managers, traffic.....	314	---	15
Manufacturing.....	462	---	23
Manufacturing checkers, examiners and inspectors.....	643	450	--
Marine Corps officers and enlisted men.....	549	555	29
Marine engineers.....	086	093	8
Marshals and constables.....	852	853	38
Masons, brick and stone.....	405	---	29
Mathematicians.....	135	000	5
Mathematics professors.....	042	060	7
Meat cutters, except slaughterhouse.....	675	---	32
Mechanical engineer.....	085	---	8
Mechanics and repairmen; air conditioning, heating and refrigeration.....	470	480	24
Mechanics and repairmen, airplane.....	471	480	24
Mechanics and repairmen, automobile.....	472	---	23
Mechanics and repairmen NEC.....	480	---	24
Mechanics and repairmen, office machines....	473	480	24
Mechanics and repairmen, radio and television.....	474	480	24

	Occupation Code	Grouped Code	Commentary Page
Mechanics and repairmen, railroad and car shop.....	475	480	24
Mechanics apprentices, automobile.....	601	472	23
Mechanics apprentices, except automobile...	610	480	24
Mechanics, logging.....	464	970	40
Medical sciences professors.....	043	060	7
Medical technicians.....	185	---	10
Merchant Marines.....	553	703	33
Messengers.....	324*	---	--
Messengers, telegraph.....	351*	---	--
Metal filers, grinders and polishers.....	653	523	27
Metal heaters.....	671	435	21
Metal jobsetters.....	452	523	27
Metallurgical engineers.....	090	093	8
Metal molders.....	492	---	24
Metal rollers and roll hands.....	513	525	28
Metal workers, structural.....	528	---	27
Metal workers, tin, copper and sheet.....	525	---	27
Metalworking trades (NEC) apprentices.....	614	523	27
Meteorologists.....	141*	---	--
Midwives.....	840*	---	--
Military machinists.....	461	465	23
Milk route deliverymen.....	656	---	32
Millers, grain, flour and feed.....	490	---	24
Milliners.....	680*	---	--
Millworkers, paper and pulp.....	500	---	25
Millworkers, sash-door and pole.....	974	---	--
Millwrights.....	491	---	24
Mine motormen.....	690*	---	--
Mine operatives and laborers.....	685	---	32
Mining engineers.....	090	093	8
Mink rancher.....	387	---	--
Model makers, except paper.....	502	---	--
Molders, metal.....	492	---	24
Motel owners and managers.....	819	---	37
Motion picture projectionists.....	493	---	24
Motormen, mine and factory.....	690*	---	--
Motormen; street, subway and elevated railway.....	691	---	--
Musicians.....	120	---	9
Music teachers.....	120	---	9

N

Navigators, airplane.....	012	---	5
Navy officers and enlisted men.....	551	---	--
Natural sciences professors.....	052	060	7
Newsboys.....	390	---	18

	Occupation Code	Grouped Code	Commentary Page
Newspaper owners.....	076	---	7
Nonscientific professors.....	054	060	7
Nuclear engineer.....	087	558	29
Nurserymen.....	202	---	14
Nurses, practical.....	842*	---	--
Nurses, professional.....	150*	---	--
Nurses, student professional.....	151*	---	--
Nursing home managers.....	811*	---	--
Nutritionists.....	073*	---	--

0

Office boys.....	324*	---	--
Office machine operators.....	325*	---	--
Office machine repairmen.....	473	480	24
Officers, ship.....	265	703	33
Officials, Boeing.....	294	557	29
Officials, lodge.....	275	---	14
Officials, public administration.....	270	---	14
Officials, public utility.....	364	363	17
Officials NEC.....	290	---	--
Officials, society.....	275	---	14
Officials, sports.....	180*	---	--
Officials, union.....	275	---	14
Oil drillers.....	416	---	20
Oilers, except automobile.....	692	---	33
Operating engineers.....	096	093	8
Operatives NEC.....	722	---	35
Operators, heavy equipment.....	676	425	21
Operators, power station.....	701	520	27
Operators, telegraph.....	352	---	16
Operators, telephone.....	353*	---	--
Opticians.....	494*	---	--
Optometrists.....	152	---	8
Orchardists.....	201	---	11
Orchard laborers.....	983	---	41
Ordnance plant workers.....	725	---	35
Organ tuners and repairmen.....	504*	---	--
Osteopaths.....	153	162	10
Owners, furniture store.....	297	---	15
Owners, garage.....	293	632	30
Owners, lumber company.....	292	---	14
Owners, newspaper.....	076	---	7
Owners, pet shop.....	296*	---	--
Oyster men.....	962	---	39

P	Occupation Code	Grouped Code	Commentary Page
Packers NEC.....	693	---	33
Painters, construction and maintenance.....	495	694	33
Painters, sign.....	694	---	33
Paperhangers.....	501	---	25
Papermill workers.....	500	---	25
Parking attendants.....	632	---	30
Parks workers.....	724	---	35
Parts finishers, Boeing.....	657	557	29
Pattern makers, except paper.....	502	---	--
Pavers.....	425	---	21
Payroll clerks.....	333	310	15
Peddlers.....	383	380	17
Personnel workers.....	154	---	--
Pest control.....	986*	---	--
Pet store owners.....	296*	---	--
Pharmacists.....	160	---	9
Photographers.....	161	---	10
Photographic process workers.....	695	161	10
Physicians.....	162	---	10
Physicians's office attendants.....	303*	---	--
Physicists.....	140*	---	--
Physics professors.....	045	060	7
Piano tuners and repairmen.....	504*	---	--
Pilots, airplane.....	012	---	5
Pilots, ship.....	265	703	33
Pipefitters.....	510	---	26
Pipefitters, atomic energy.....	509	558	29
Plasterers.....	505	---	25
Plumbers.....	510	---	26
Plumbers and pipefitters apprentices.....	612	510	26
Plywood workers.....	706	---	34
Policemen and detectives.....	853	---	38
Polishers, metal.....	653	523	37
Porters.....	841	---	--
Postal clerks.....	340	---	16
Postmasters.....	280	---	14
Poultry farmers.....	206	---	13
Pourers, furnacemen.....	670	435	21
Powdermen and blasters.....	634	---	30
Power linemen and servicemen.....	453	---	22
Power station operators.....	701	520	27
Presidents, college.....	030*	---	--
Pressmen.....	512	---	26
Printers, plate.....	512	---	26
Printing trades apprentices.....	615	512	26
Produce, seed, feed, grain company workers..	966	---	--
Professional workers NEC.....	195	---	--
Professors/Instructors, agricultural sciences.....	031	060	7

	Occupation Code	Grouped Code	Commentary Page
Professors/Instructors, biological.....	032	060	7
Professors/Instructors, chemistry.....	034	060	7
Professors/Instructors, economics.....	035	060	7
Professors/Instructors, engineering.....	040	060	7
Professors/Instructors, forestry.....	050	060	7
Professors/Instructors, geology and geophysics.....	041	060	7
Professors/Instructors, mathematics.....	042	060	7
Professors/Instructors, medical sciences....	043	060	7
Professors/Instructors, natural sciences....	052	060	7
Professors/Instructors NEC.....	060	---	7
Professors/Instructors, nonscientific subjects.....	054	060	7
Professors/Instructors, physics.....	045	060	7
Professors/Instructors, psychology.....	050	060	7
Professors/Instructors, social sciences.....	053	060	7
Professors/Instructors, statistics.....	051	060	7
Projectionists, motion picture.....	493	---	24
Promoters.....	383	380	17
Proprietors NEC.....	290	---	--
Psychiatrists.....	173 *	---	--
Psychologists.....	173 *	---	--
Psychology professors.....	050	060	7
Public administration inspectors.....	260 *	---	--
Publicity writers.....	163 *	---	--
Public relations men.....	163 *	---	--
Public utility officials and supervisors.....	364	363	17
Public utility workers.....	363	---	17
Publishers, newspaper.....	076	---	7
Pulpmill workers.....	500	---	25
Purchasing agents.....	285	---	14
Pursers, ship.....	265	703	33

R

Radio announcers.....	010 *	---	--
Radio operators.....	164	352	16
Radio repairmen.....	474	480	14
Raftsmen (loggers).....	970	---	40
Railroad brakemen and carmen.....	640	---	31
Railroad clerks.....	361	469	23
Railroad conductors.....	252	---	13
Railroad contractors.....	408	469	23
Railroad foremen.....	427	469	23
Railroad inspectors.....	447	469	23
Railroad laborers NEC.....	981	469	23
Railroad maintenance.....	469	---	23
Railroad (and car shop) mechanics.....	475	480	24

	Occupation Code	Grouped Code	Commentary Page
Railroad switchmen.....	713	469	23
Ranchers, cattle and sheep.....	203	---	12
Real estate agents, brokers, developers and appraisers.....	393	---	18
Receiving clerks.....	343	---	16
Receptionists.....	341*	---	--
Recreation attendants (cardroom, poolhall, carnival).....	813	---	--
Recreation and amusement ushers.....	874*	---	--
Recreation workers.....	165	813	36
Refrigeration engineers.....	095	093	8
Refrigeration repairmen.....	470	480	24
Religious workers.....	170*	---	--
Reporters.....	075	---	7
Representative, sales.....	380	---	17
Resort owners and managers.....	819	---	37
Restaurant and cafe owners and managers.....	817	---	36
Restaurant employees NEC.....	835	825	36
Retarded and disabled.....	997	---	--
Road construction and maintenance, county-city.....	496	425	21
Road machinery operators.....	425	---	21
Rodmen, surveying.....	642*	---	--
Rollers and roll hands, metal.....	513	525	28
Roofers.....	514	---	26
Rope makers.....	711	412	20
Routemen.....	650	---	31

S

Sailmakers.....	412	---	20
Sailors.....	703	---	33
Sales clerks NEC.....	396	---	18
Sales engineers.....	092	093	8
Sales, lumber.....	384*	---	--
Sales managers.....	285	---	14
Salesmen, car.....	386	---	18
Salesmen, chemical.....	388*	---	--
Salesmen, stock and bond.....	395	---	--
Salesmen, travelling.....	380	---	17
Sales representatives.....	380	---	17
Salvage workers.....	892	---	--
Sandblasters.....	725*	---	--
Sanitarians.....	176*	---	--
Saw filers.....	704	---	33
Sawmill truckers.....	717	715	34
Sawmill workers.....	704	---	33
Sawyers.....	704	---	33

	Occupation Code	Grouped Code	Commentary Page
Scalers, log and lumber.....	444	---	22
School custodian.....	836	834	37
Scientists, agricultural.....	130*	---	--
Scientists, biological.....	131*	---	--
Scientists, natural NEC.....	145*	---	--
Scientists, social.....	175*	---	--
Seamen NEC.....	703	---	33
Secretaries.....	342*	---	--
Seed company workers.....	966	---	--
Servicemen, telegraph, telephone, power.....	453	---	22
Service workers NEC.....	890*	---	--
Sextons.....	834	---	37
Sewers and cutters, manufacturing.....	705	412	20
Shepherd.....	907	---	--
Sheet metal workers.....	525	---	27
Sheriffs and bailiffs.....	854	853	38
Shingle weaver.....	974	---	40
Shipfitters.....	507	---	25
Shippers, farm products.....	251	---	13
Shipping clerks.....	343	---	16
Shipwrights.....	409	507	25
Shipyard electricians.....	422	507	25
Shipyard machinists.....	467	507	25
Shipyard workers NEC.....	507	---	25
Shoemakers and repairers.....	515	---	26
Shoeshine operators.....	820	---	--
Sign painters.....	694	---	33
Silversmiths.....	451	---	22
Slaters.....	514	---	26
Slaughterhouse butchers.....	677	675	32
Smelter workers.....	435	---	21
Social science professors.....	053	060	7
Social scientist.....	175*	---	--
Social worker.....	171*	---	--
Society officials.....	275	---	14
Spinners, textile.....	710	412	20
Sports instructors and officials.....	180*	---	--
Station agents.....	354	---	17
Stationary engineers.....	520	---	27
Stationary firemen.....	712	520	27
Statisticians.....	174	000	5
Statistics professors.....	051	060	7
Steam engineers.....	099	093	8
Steamfitters.....	508	510	26
Steamfitters, atomic energy.....	509	558	29
Stenographers.....	345*	---	--
Sterotypers.....	423	512	26
Stevedores.....	965	---	39

	Occupation Code	Grouped Code	Commentary Page
Stewards and housekeepers.....	832	---	--
Stock clerks and storekeepers.....	350	---	16
Stock salesmen.....	395	---	--
Stonecutters and carvers.....	521	---	27
Stonemasons.....	405	---	19
Storage workers and truck drivers.....	719	715	34
Structural metal workers.....	523	---	27
Students.....	196	---	11
Superintendents, building.....	262	---	--
Supervisors, Boeing.....	294	557	29
Supervisors, public utility.....	364	363	17
Surgeons.....	162	---	10
Surveying chainmen, rodmen and axmen.....	642*	---	--
Surveyors.....	181	---	--
Switchmen, railroad.....	713	469	23

T

Tailors.....	524	---	27
Tanners.....	515	---	26
Tavern owners and operators.....	816	815	36
Taxicab drivers.....	714	---	34
Teachers, art.....	014	---	5
Teachers, dancing.....	070*	---	--
Teachers, elementary.....	182	184	10
Teachers, high school.....	183	184	10
Teachers, music.....	120	---	9
Teachers, NEC and administration.....	184	---	10
Teachers, secondary.....	182	184	10
Teamsters.....	971	715	34
Technical workers NEC.....	195	---	--
Technicians, electrical and electronic.....	190	421	21
Technicians, engineering and physical sciences.....	191*	---	--
Technicians, medical and dental.....	185	---	10
Technicians NEC.....	192*	---	--
Telegraph messengers.....	351*	---	--
Telegraph linemen and servicemen.....	453	---	22
Telegraph operators.....	352	---	16
Telephone linemen and servicemen.....	453	---	22
Telephone operators.....	353*	---	--
Television repairmen.....	474	480	24
Temperers.....	435	---	21
Textile spinners.....	710	412	20
Textile weavers.....	720	412	20
Therapists.....	193*	---	--
Ticket agents.....	354	---	17
Tile setters.....	405	---	19

	Occupation Code	Grouped Code	Commentary Page
Timber cruisers.....	444	---	22
Timekeeping clerks.....	333	310	15
Tinsmiths.....	525	---	28
Tire recappers.....	291	632	30
Tool and die makers.....	530	---	28
Toolmakers.....	530	---	28
Toppers, textile manufacturing.....	673	412	20
Traffic managers.....	314	---	15
Transfer workers and truck drivers.....	719	715	34
Travelling salesmen.....	380	---	17
Tree farmers.....	724	--	35
Truck drivers.....	715	---	34
Truck drivers, fuel oil.....	716	---	34
Truck drivers helpers.....	972	715	34
Truck drivers, lumber and log.....	718	715	34
Truck drivers, moving, transfer and storage.....	719	715	34
Truck drivers, sawmill.....	717	715	34
Tuners, piano and organ.....	504*	---	--
Typesetters.....	414	512	26
Typists.....	360*	---	--

U

Underwriters, insurance.....	385	---	17
Unemployable.....	997	---	41
Unemployed.....	998	999	42
Union officials.....	275	---	14
Unknown.....	999	---	--
Upholsterers.....	535	---	29
Ushers, recreation and amusement.....	874*	---	--

V

Vegetable graders and packers.....	654*	---	--
Vehicle dispatchers.....	314	---	15
Veterinarians.....	194	---	10

W

Waiters.....	875	---	38
Wall washers.....	833	---	37
Warehousemen NEC.....	973	350	16
Watchmakers.....	451	---	22
Watchmen, atomic energy plant.....	856	558	29
Watchmen, crossing.....	860*	---	--
Watchmen, guards and doorkeepers.....	851	---	--
Watchmen, lumber and logging.....	855*	970	40

	Occupation Code	Grouped Code	Commentary Page
Weavers, textile.....	720	412	20
Welders.....	721	---	35
Welfare workers.....	171*	---	--
Well drillers.....	416	---	20
Wheat farmers.....	205	---	12
Window cleaners.....	833	---	37
Window dressers.....	420	---	--
Woodchoppers (loggers).....	970	---	40
Woodsmen (loggers).....	970	---	40
Woodworkers.....	974	---	40
Wool workers.....	907	---	--
Wrappers NEC.....	693	---	33
Writers, publicity.....	163*	---	--