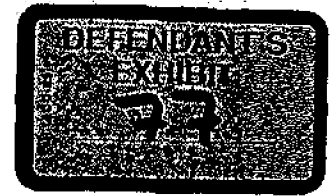
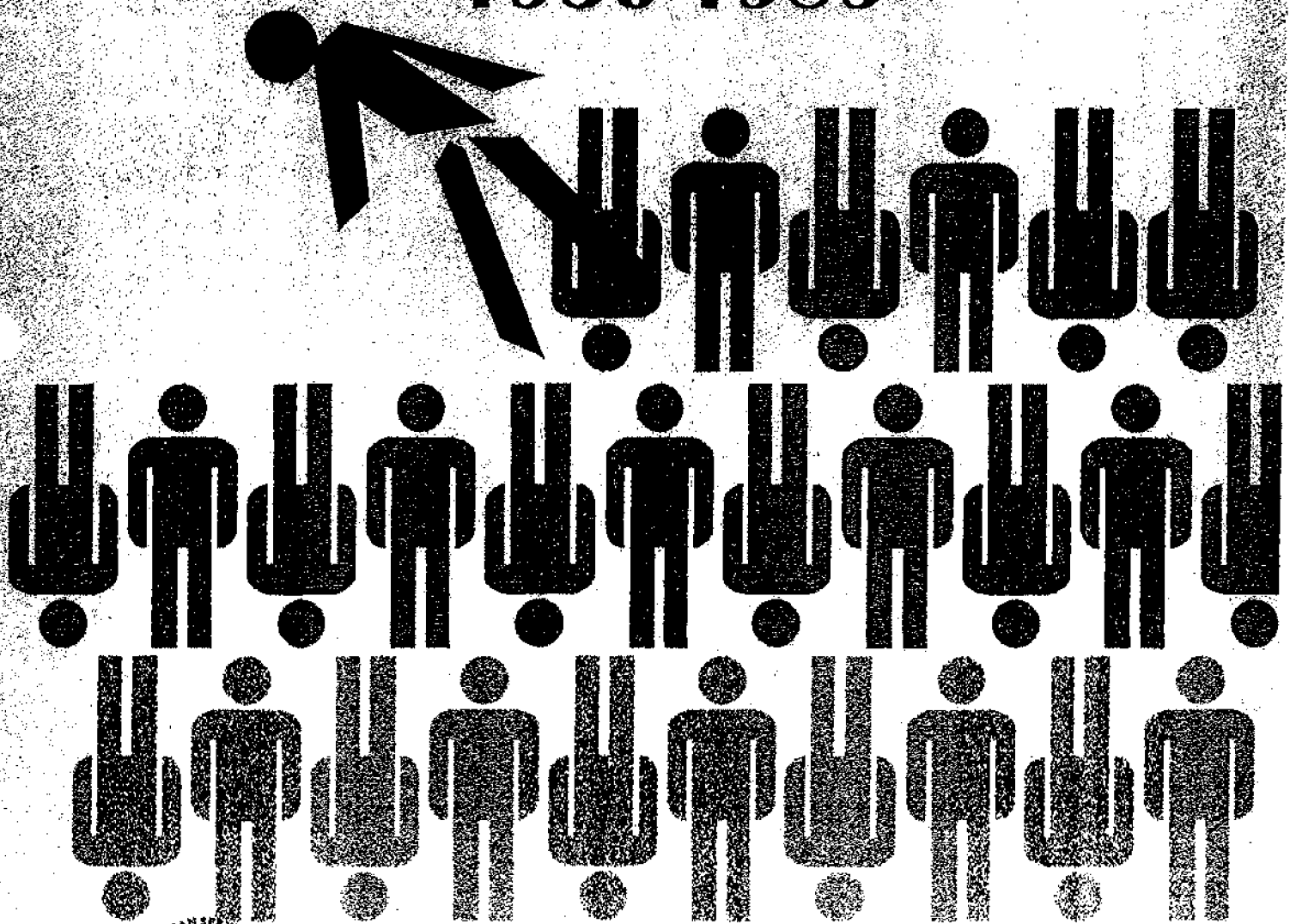


NIOSH



Occupational Mortality in Washington State 1950-1989



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health



OCCUPATIONAL MORTALITY IN WASHINGTON STATE

1950-1989

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Public Health Service
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ABSTRACT

The occupational and cause-of-death information on 588,090 Washington State male deaths for 1950-1989 and 88,071 female deaths for 1974-1989 was analyzed using an age and year-of-death standardized proportionate mortality ratio program. A detailed cause-of-death analysis (161 causes) is published for each of 219 occupational categories for males and for each of 68 occupational categories for females.

The occupational mortality findings are compared with those of the Registrar General and with the published occupational mortality literature. The Washington State mortality pattern is, in general, consistent with both the Registrar General's results and with the published literature. Some of the new occupational mortality findings published in the 1950-1971 report and in the updated version have been confirmed.

The previous finding of a leukemia increase in workers exposed to electric and magnetic fields is confirmed in this report.

Commentary on Table i (Male Mortality, 1950-1989)

Paper Hangers and Decorators (Painters)

Occupation Code 501

Total Deaths 947

AIDs has a high PMR based on 8 deaths observed to less than 1 expected. Lung cancer, lymphosarcoma and reticulosarcoma, and ulcer of stomach have elevated PMRs.

Plasterers and Lathers

Occupation Code 505

Total Deaths 1,071

Stomach, lung and pleural cancer have elevated PMRs. Subarachnoid hemorrhage, and emphysema also have excess deaths. The lung and pleural cancer increase may be due to asbestos exposure.

Shipyards Workers, Shipwrights, and Shipfitters

Occupation Code 507

Total Deaths 8,802

Peritoneal, lung, and pleural cancers all have PMR increases due to asbestos exposures. Interestingly, 31 of 34 pleural and 6 of 7 peritoneal cancer deaths occurred after 1975, suggesting that the long latency period since the World War II shipbuilding boom has been spanned. The benign neoplasm increase is due to mesothelioma deaths not specified as being malignant. Asbestosis, as expected, has a very high PMR. Accidental falls also show excess deaths. Asbestosis has been studied in other shipyards (44).

Plumbers and Pipefitters

Occupation Code 510

Total Deaths 5,871

Cancers of esophagus, lung, and pleura have increased PMRs. The pleural cancer excess is due to asbestos exposure. Pulmonary emphysema and death due to fire and explosion also have high PMRs. The lung and esophageal cancer excesses are supported in a U.S. plumbers union study (45). The pleural cancer excess is supported in a study of California plumbers and pipefitters (46).

Printing Pressmen, Plate Printers, and Typesetters

Occupation Code 512

Total Deaths 2,775

Cancers of the tongue, oral mesopharynx, rectum, and lung have high PMRs. A cohort study (47) of newspaper pressmen supports the lung cancer increase, and a PMR study of printing pressmen (48) supports the rectal cancer increase. Unspecified falls also are in excess.

Roofers and Slaters

Occupation Code 514

Total Deaths 1,057

Respiratory tuberculosis, cancer of the tongue, and lung, asthma (before 1976), pulmonary emphysema, cirrhosis of the liver, accidental falls, and homicide all have increased mortality. Hot tar roofing exposes these men to inhaled carcinogens.

Commentary on Table 1 (Male Mortality, 1950-1989)

Welders and Flame Cutters

Occupation Code 721

Total Deaths 3,168

Cancers of the lung and kidney, hypertensive disease, chronic bronchitis, chronic interstitial pneumonitis and deaths due to fire and explosion have increased mortality.

Tree Farmers, Forest Service and Parks Department Workers

Occupation Code 724

Total Deaths 1,541

Lymphatic leukemia, accidental falls, deaths caused by fire and explosion and machinery related accidents have increased PMRs.

Hospital/Institution Attendants

Occupation Code 810

Total Deaths 710

Tuberculosis, diabetes mellitus, chronic rheumatic heart disease, and pulmonary emphysema have extra deaths.

Recreation/Amusement Attendants (Cardroom, Poolhall, Carnival)

Occupation Code 812

Total Deaths 723

Tuberculosis, AIDs, cancer of urinary bladder (before 1976), multiple myeloma, cirrhosis of the liver and infections of the kidney have elevated PMRs.

Barbers

Occupation Code 814

Total Deaths 3,705

The multiple myeloma, asthma, and nephritis excess seen in deaths before 1976 has disappeared. Cirrhosis of the liver, chronic enteritis, and suicide have increased deaths throughout the study.

Bartenders

Occupation Code 815

Total Deaths 3,419

Alcohol related causes have high PMRs: i.e., cancer of the buccal cavity and pharynx, biliary passages and liver, larynx, and cirrhosis of the liver. Other causes with PMR elevations are AIDs, diabetes mellitus (before 1976), other diseases of the lung, duodenal ulcer, intestinal obstruction and homicide.

Commentary on Table 3 (Male Mortality By Occupation Within Cause of Death Groups 1950-1989)

Acute Leukemia (ICD 204.3)

Four occupations in this group are exposed to electric and magnetic fields: Radio and TV mechanics, telephone installers and repairers, public utility supervisors and electricians.

Benign Neoplasms (ICD 210-229)

Two of the six occupations with elevated PMRs due to benign neoplasms have known exposure to asbestos (asbestos and insulation workers and shipyard workers). Examination of the death certificates reveals that the excess seen in asbestos and insulation workers and shipyard workers is due to pulmonary and/or abdominal mesothelioma, i.e., "malignant mesothelioma" is coded to 162.2, while "mesothelioma" is coded to a benign neoplasm rubric.

Paralysis Agitans (ICD 350)

Three of this group of occupations have solvent exposures: fuel oil dealers and workers, body and fender repairmen and auto painters, and railroad/car shop mechanics and repairmen.

Amyotrophic Lateral Sclerosis (ALS) (ICD 356.1)

Three Boeing code group occupations are present in this group: aeronautical engineers, airplane mechanics and repairmen, and Boeing Workers.

Diseases of the Respiratory System (ICD 470-527)

Cigarette smoking and exposure to asbestos, silica, metal fumes, and other toxic inhalants can cause these diseases. The occupations with high PMRs reflect this.

Silicosis (ICD 523.0)

Metal molders, stonemasons and stonecarvers, miners, and road graders are all exposed to free crystalline silica.

Asbestosis (ICD 523.2)

Shipyard workers and asbestos and insulation workers are exposed to asbestos fibers.

Cirrhosis of the Liver without Alcoholism (ICD 581.0)

Cirrhosis of the Liver with Alcoholism (ICD 581.1)

Ulcer of the Stomach (ICD 540)

Acute Pancreatitis (ICD 587.0)

These causes of death are all related to excessive ingestion of alcohol. Alcoholism is probably an occupational hazard of bartenders and restaurant and cafe workers. Men in the other occupations with high PMRs due to these causes probably suffer alcoholism due to lifestyle, not occupation.

4. Amyotrophic Lateral Sclerosis (ALS) in Boeing workers.

There were 12,609 deaths in 12 distinguishable Boeing-related occupational codes. With 1,071 ALS deaths among the 588,090 total deaths in the study $1,071 \div 588,090 \times 12,609 = 22.9$ ALS deaths would have been expected among the Boeing workers, while 58 were observed. Boeing occupations with relatively high ALS PMRs are: engineers, mechanics, inspectors, parts finishers, and draftsmen.

Occ Code	Title	Total Deaths	ALS Deaths
080	Aeronautical Engineers	380	4
089	Draftsmen	119	2
097	Boeing Engineers	1,671	12
294	Supervisors and Managers	1,450	4
362	Clerks	320	1
419	Electricians	379	2
446	Inspectors	531	3
466	Machinists	1,649	4
468	Maintenance Workers	299	1
471	Airplane Mechanics	1,478	8
557	Boeing Workers NEC	3,871	14
657	Parts Finishers	462	3
TOTAL:		12,609	58

Index of Occupations For 1962

Occupations	Number of Deaths	Occu Code	Grouped Code	Commentary Page
Tuners, Piano & Organ	135	504*	---	---
Typesetters	518	414	512	27
Typists	38	360*	---	---
Underwriters, Insurance	3966	385	---	19
Unemployable	2288	997	---	38
Unemployed	733	998	999	38
Union Officials	1011	275	---	15
Unknown	10212	999	---	38
Upholsterers	659	535	---	29
Ushers, Recreation, Amusement	10	874*	---	---
Vegetable Graders/Packers	147	654	975	37
Vehicle Dispatchers	1128	314	---	17
Veterinarians	289	194	---	13
Waiters	414	875	---	35
Wall Washers	251	833	---	34
Warehousemen, Fruit	607	975	---	37
Warehousemen NEC	3131	973	---	37
Watchmakers	1381	451	---	23
Watchmen, Atomic Energy Plant	179	856	558	30
Watchmen, Crossing	392	860	851	35
Watchmen, Guards/Doorkeeper	2860	851	---	35
Watchmen, Lumber/Logging	434	855*	---	---
Water Well Drillers	385	426	---	22
Weavers, Textile	60	720	412	21
Welders	506	721	---	33
Welders, Rubber	506	477	---	25
Welfare Workers	472	171*	---	---
Well Drillers, Oil	372	416	---	22

Index of Occupations For [REDACTED]

Occupation	Number of Deaths	Occu Code	Grouped Code	Commentary Page
Union officials	128	275*	---	---
Unknown	1488	999	---	47
Upholsterers	74	535*	---	---
Ushers, recreation/amusement.	2	874*	---	---
Veterinarians	17	194*	---	---
Waitresses	2800	875	---	47
Warehousewomen	97	973	343	42
Warehousewomen, fruit	152	975	---	47
Watchmakers & jewelers	95	451*	---	---
Watchwomen & guards	92	851*	---	---
Watchwomen, lumber & logging	3	855*	---	---
Weavers, textile	54	720	412	44
[REDACTED]	[REDACTED]	721*	---	---
Welfare workers	640	171	---	40
Wheat farmers	50	205	200	41
Woodworkers	220	974*	---	---
Wrappers, meat	218	675	---	45
Writers, publicity	85	163*	---	---
X-Ray technicians	75	186*	---	---

Proportionate mortality ratios in Washington State

Table 1: White males, 1950-89

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Cause of death	7 th ICD		1950-1989	Age at death (20-64)
Psychoneurotic disorders	310-318	OBS	1	1
		EXP	2	1
		PMR	49	-
Disorders of character behavior and intelligence	320-326	OBS	19	19
		EXP	21	18
		PMR	90	107
Vascular lesions affecting central nervous system	330-334	OBS	205	84
		EXP	196	73
		PMR	105	115
Subarachnoid hemorrhage	330	OBS	16	14
		EXP	16	13
		PMR	102	106
Cerebral hemorrhage and other vascular lesions	331, 334	OBS	138	44
		EXP	137	45
		PMR	101	98
Cerebral embolism and thrombosis	██████	OBS	51	26
		EXP	43	15
		PMR	118	177**
Inflammatory diseases of central nervous system	340-345	OBS	2	2
		EXP	8	6
		PMR	26	31
Multiple sclerosis	345	OBS	2	2
		EXP	5	4
		PMR	43	52
Paralysis agitans	350	OBS	4	-
		EXP	8	2
		PMR	49	-
Amyotrophic lateral sclerosis	356.1	OBS	3	2
		EXP	6	4
		PMR	47	53
Diseases of circulatory system	400-468	OBS	1230	615
		EXP	1291	653
		PMR	95	94

* p < 0.05

** p < 0.01