MONASH University
Medicine, Nursing and Health Sciences

Fiskville Firefighters' Health Study

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Fiskville study aims and objectives

- Investigate cancer incidence compared to the general Victorian population.
- Compare cancer incidence between the high, medium & low groups (Joy report).
- Investigate mortality rate compared to general Australian population.
- Compare mortality rate between the high, medium & low groups.

Assembling the study group

Retrospective study

- Fiskville attendees 1971-1999
- CFA assembled data from existing HR records, photographs, newsletters, personal contacts + snowballing
- CFA categorised firefighters into groups as defined by Joy report (high, medium, low)

Ethics Approval from Monash University, State and Territory Cancer registries, Australian Institute of Health and Welfare, and National Coronial Information System.

Size of the groups

Groups from Joy report	"Overall relative risk of chronic exposure"	Number of men in cohort
Practice Area for Drill Workers Instructors (full-time)	High	95
Instructors (volunteer & regional staff)	Medium	256 (105 paid,151 vol)
Paid trainees (practical firefighting training)	Low	252

Only 5 women included no analysis possible

Completeness of dataset

High group:
CFA confident all identified from HR records & group photos

Medium group:
CFA confident all paid officers identified from HR records & group photos. Possible few volunteer instructors not identified. Pre 1994 leavers more likely to be missing (paper records only).

Low group
Less confident all identified. Photos missing early years (1970s). Pre 1994 leavers more likely to be missing (paper records only).

Mortality and cancer incidence methodology

- Names and dates of birth matched to national cancer and death records at AIHW and Victorian Cancer Registry
- Identify deaths and cancer cases
- Compare risks to general population
- Examine risk for 3 subgroups:
  - Low, Medium and High

Cancer incidence findings compared to Victorian population

Cancer Categories	Low (N=252)			Medium (N=256)			High (N=95)		
	O	E	SIR (95% CI)	O	E	SIR (95% CI)	O	E	SIR (95% CI)
Lip, buccal cavity & pharynx	0	0.86		1	1.54	0.65 (0.02 -3.62)	1	0.62	1.61 (0.04 - 8.98)
Digestive	0	2.87		9	7.19	1.25 (0.57 - 2.38)	3	2.93	1.02 (0.21 - 2.99)
Colorectal	0	1.70		4	4.26	0.94 (0.26 - 2.40)	2	1.79	1.12 (0.14 - 4.05)
Respiratory	0	1.13		3	3.56	0.84 (0.17 - 2.46)	1	1.48	0.68 (0.02 - 3.77)
Melanoma	3	2.10	1.43 (0.29 - 4.18)	5	3.31	1.51 (0.49 - 3.52)	6	1.31	4.59 (1.68 - 9.99)
Male reproductive	2	3.86	0.52 (0.06 - 1.87)	7	9.82	0.71 (0.29 - 1.47)	7	3.95	1.77 (0.71 - 3.65)
Prostate	2	3.16	0.63 (0.08 - 2.28)	7	8.90	0.79 (0.32 - 1.62)	5	3.50	1.43 (0.46 - 3.34)
Testis	0	0.64		0	0.48		2	0.17	11.9 (1.44 - 42.9)
Urinary tract	0	0.86		1	1.98	0.50 (0.01 - 2.81)	1	0.79	1.27 (0.03 - 7.07)
Brain & nervous system	0	0.45		4	0.70	5.74 (1.56 - 14.7)	1	0.28	3.63 (0.09 - 20.3)
Lymphoid & Haematopoetic (LH)	0	1.94		4	3.58	1.12 (0.30 - 2.86)	4	1.41	2.83 (0.77 - 7.24)
Other & unknown	1	1.01	0.99 (0.03 - 5.51)	4	1.90	2.11 (0.57 - 5.39)	1	0.75	1.34 (0.03 - 7.45
Overall	6	15.05	**0.40 (0.15 - 0.87)**	38	33.57	1.13 (0.80 - 1.55)	25	13.51	1.85 (1.20 - 2.73)

Comparing within the cohort groups

All cause cancer	Number of cancers	RIR (95% CI)*
Low	6	1
Medium	23	2.66 (1.09 - 6.51)
High	24	4.22 (1.67 - 10.7)

* adjusted for age and calendar year

Mortality findings compared to Australian population

Cause of death categories	Low (N=252)			Medium (N=256)			High (N=95)		
	O	E	SMR (95% CI)	O	E	SMR (95% CI)	O	E	SMR (95% CI)
Malignancies	1	3.40	0.29 (0.01 - 1.64)	9	10.38	0.87 (0.40 - 1.65)	6	4.10	1.47 (0.54 - 3.19)
Circulatory	0	2.53		7	9.77	0.72 (0.29 - 1.48)	1	3.28	0.30 (0.01 - 1.70)
Injury & Trauma	1	4.22	0.24 (0.01 - 1.32)	3	4.33	0.69 (0.14 - 2.03)	0	1.56	
All Causes of Death	2	13.04	**0.15 (0.02 - 0.55)**	19	31.65	**0.60 (0.36 - 0.94)**	7	11.46	0.61 (0.25 - 1.26)

Medium group contains volunteers and paid firefighters

Other checks

1. Looked at overall risk compared to Victorian born population, similar findings.

2. Excluded those with no HR recorded start date at Fiskville, similar findings but brain cancer risk no longer significantly increased in Medium group. Suggests that those with cancer may be preferentially recalled.

3. Estimated would need 80 cancer-free firefighters missing from high group to explain excess cancers.

Limitations

- Small size so low power to detect effects
- Concern about the completeness of low group and medium volunteer groups
- No information about smoking, other lifestyle factors
- Doesn’t take into account other periods of firefighting
- Crude exposure metrics, no specific exposures were identified or measured.

Conclusions

- High group: more than expected cancers – overall cancer, melanoma, testis
- Medium group: more than expected brain cancers. No increase in overall cancer
- Low group: fewer than expected overall cancers. Probable incomplete dataset.
- Mortality: no increase high group. Reduced risk of death low + medium groups. Healthy worker effect.

Association vs Causation - Epidemiology

Epidemiology shows associations

Criteria for causation (Bradford Hill 1965)

-Strength of association

-Exposure response

-Temporal relationship

-Biologically plausible

-Evidence from other studies

Future possibilities

- Future regular linkages to death + cancer registries now that cohort is established.
- Further development of exposure metrics if more exposure information becomes available.
- Further work to identify any missing Fiskville firefighters or others attending the site.
- Australian Firefighters' Study – research centre for firefighter health.

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