

# Perceived Health Risks Among Firefighters; A Survey of New Jersey Firefighters

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## INTRODUCTION

### KNOWLEDGE GAP

There is a growing body of literature on the health effects of firefighting, however, there is little information on firefighters' perception of these health risks

### STUDY GOAL

Understand firefighters' perceptions of how firefighting impacts health in order to develop future education and preparatory programs

### Firefighting Morbidity & Mortality

- Firefighting is a dangerous occupation that can put firefighters at increased risk of injury, illness, disability, and death

### Cancer Risk & Firefighting

- Firefighters are exposed to carcinogens as a result of their work:
  - Asbestos, radioactive materials, chemicals, and toxic fumes
- Results from a recent meta-analysis (Jalilian et al., 2019) of firefighters found incidence and mortality for some cancers were significantly elevated among firefighters compared to the general population:

#### Increased cancer incidence:

- Bladder
- Colorectal
- Malignant melanoma
- Pleural
- Prostate
- Testicular
- Thyroid

#### Increased cancer mortality:

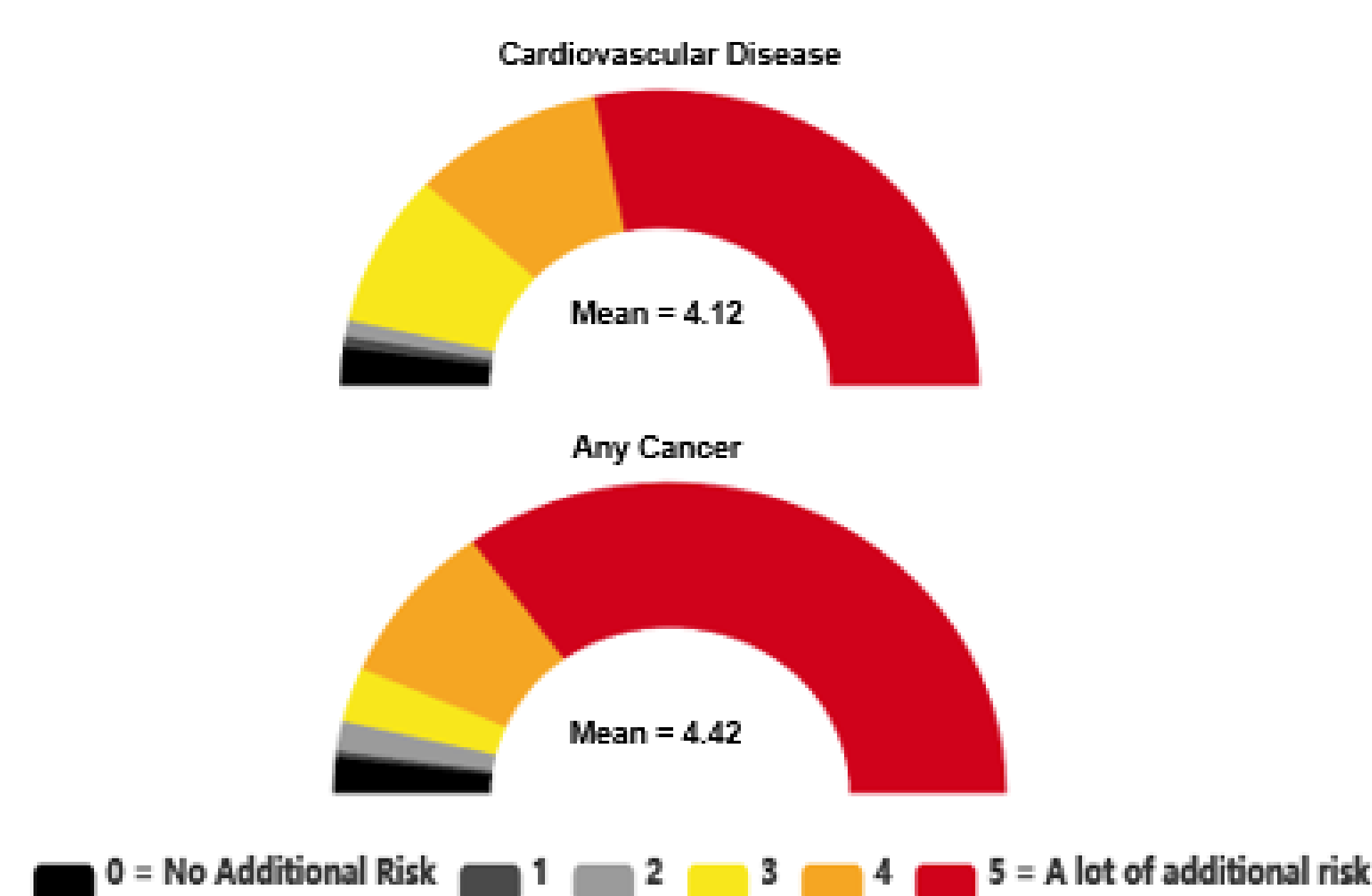
- Rectal
- Non-Hodgkin's lymphoma

- According to the International Agency for Research on Cancer (IARC):
  - Occupational exposures encountered by firefighters may be "possibly carcinogenic to humans" (Group 2B)

### Heart Disease & Firefighting

- Sudden cardiac death accounts for the largest proportion of on-duty firefighter deaths annually
- Complex physiologic response to work-related stress and underlying individual risk factors (e.g., smoking status, hypertension and pre-existing heart disease) makes understanding the cumulative impact of firefighting on cardiac-related mortality challenging

Figure. Perceived Additional Risk from Firefighting



## METHODS & RESULTS

### Survey Design

- Developed using standardized instruments and validated scales
- Reviewed by content experts and union leadership

### Survey Domains

- Firefighting experience
- Cancer screening history
- Demographics
- Risk behaviors
- Risk Perception for illnesses
  - 6-point Likert scale

### Implementation

- Annual union member event
- Paper survey
- Voluntary participation

### Respondents

- 169 completed surveys
  - 1 excluded (n = 168)

### Statistical Analysis

- Chi square tests were used to assess the association between:
  - Perceived additional disease risk due to firefighting and
  - Demographics and risk factors of interest

Table 1. Characteristics of survey participants

Demographic Characteristics			Alcohol and Tobacco use		Firefighter experience	
Age (years; mean, sd)	43.8	11.8	Hazardous Alcohol Consumption <sup>2</sup> (n, %)		Firefighter Type (n, %)	
Gender (n, %)			Positive Screen	93 58.5%	Career Firefighter	147 88.6%
Male	166	99.4%	Tobacco Use		Volunteer Firefighter	3 1.8%
Race (n, %)			Cigarette smoking status (n, %)		Both	16 9.6%
White, non-Hispanic	127	77.9%	Current	13 8.2%	Firefighter Duty Status (n, %)	
Education (n, %)			Former	39 24.7%	Active	135 85.4%
High School Graduate	41	24.9%	Never	106 67.1%	Not active	23 14.6%
Some College	80	48.5%	Smokeless Tobacco Use (SLT; n, %)		Responded to WTC (9/11/2001) Attacks (n, %)	
College Graduate	43	26.1%	Ever	27 16.4%	Yes	39 23.4%
Other	1	0.6%	Dual Users (cigarettes & SLT; n, %)			
Marital Status (n, %)			Ever	19 12.1%		
Married/LWP	109	66.1%	Any Tobacco Users (cigarettes & SLT; n, %)			
Body Mass Index <sup>1</sup> (n, %)			Ever	66 42.0%		
Normal	7	4.2%	Electronic Cigarettes (n, %)			
Overweight	78	46.7%	Ever	10 6.1%		
Obese	70	41.9%				

<sup>1</sup>BMI: Body Mass Index = weight in kg / height in meters squared, groups based on NIH clinical cutoffs (normal: 18.5-24.5; overweight: 25.0-29.9; obese: ≥30.0)

<sup>2</sup>AUDIT-C: Alcohol Use Disorders Identification Test is a 10-item screening tool developed by the World Health Organization (WHO) to assess alcohol consumption, drinking behaviors, and alcohol-related problems.

Table 2: Bivariate analysis

Perceived additional risk from firefighting for:	Risk Level	Current age (grouped by percentiles)								FF Duty Status			Hazardous Drinking (AUDIT-C)					
		≤ 34 years old		35 to 43 years old		44 to 52 years old		≥ 53 years old		Active		Not Active		Positive for HD		Negative for HD		
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	p-value
Any cancer	Low	13	29.6%	11	32.4%	12	34.3%	8	22.2%	38	29.5%	7	35.0%	22	24.2%	23	39.0%	0.6975
	High	31	70.5%	23	67.7%	23	65.7%	28	77.8%	91	70.5%	13	65.0%	69	75.8%	36	61.0%	
Heart disease	Low	21	46.7%	18	51.4%	17	44.7%	12	30.8%	59	43.7%	9	40.9%	39	41.9%	30	46.2%	0.2987
	High	24	53.3%	17	48.6%	21	55.3%	27	69.2%	76	56.3%	13	59.1%	54	58.1%	35	53.9%	
Bladder cancer	Low	30	66.7%	17	50.0%	23	60.5%	27	79.4%	80	60.6%	17	89.5%	57	64.0%	41	65.1%	0.0803
	High	15	33.3%	17	50.0%	15	39.5%	7	20.6%	52	39.4%	2	10.5%	32	36.0%	22	34.9%	
Blood cancer	Low	27	60.0%	15	44.1%	21	55.3%	21	65.6%	70	53.9%	14	73.7%	48	54.6%	37	59.7%	0.3273
	High	18	40.0%	19	55.9%	17	44.7%	11	34.4%	60	46.2%	5	26.3%	40	45.5%	25	40.3%	
Colon cancer	Low	22	48.9%	16	47.1%	23	62.2%	24	68.6%	69	52.3%	16	84.2%	49	55.1%	37	58.7%	0.1836
	High	23	51.1%	18	52.9%	14	37.8%	11	31.4%	63	47.7%	3	15.8%	40	44.9%	26	41.3%	
Prostate cancer	Low	18	40.9%	18	51.4%	24	64.9%	25	67.6%	71	53.4%	14	70.0%	46	50.6%	40	63.5%	0.0569
	High	26	59.1%	17	48.6%	13	35.1%	12	32.4%	62	46.6%	6	30.0%	45	49.5%	23	36.5%	

## DISCUSSION & CONCLUSIONS

### Opportunities Identified

- Firefighters in our study attributed considerable additional risk for the development of heart disease and any type of cancer to their firefighting experience
- Greater than 89% of our population is classified as overweight or obese, a modifiable risk factor associated with the development of heart disease and several types of cancer
- This information supports the importance of identifying modifiable risk factors and supporting implementation of lifestyle interventions

### Limitations

- This cross-sectional study design may be subject to reverse causality
- Our study was conducted among New Jersey (NJ) firefighters attending a firefighter union event, so primarily included career firefighters, however in NJ and the US:
  - Most firefighters are volunteers (~80% in NJ)
  - In NJ ~8% of firefighters are Non-Hispanic white, our study population included 13%
  - Women comprise ~4% of NJ firefighters, but only 1% of our study population

### Conclusions

- New Jersey firefighters are very concerned about the impact of their firefighting experience on their risk for cancer and heart disease
- This is an opportunity to target specific areas with education and lifestyle intervention for New Jersey firefighters
- This survey should be implemented in other firefighter populations to improve understanding of how cancer risk perception and screening practices vary among firefighters

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