

KEY FINDINGS

Nearly all (96.4%) firefighters were exposed to some form of critical event over the span of their entire firefighting careers.
Age, gender and years of service accounted for one-third of the variance in the number of critical incident exposures among firefighters.

Background

- Critical incidents are used in reference to traumatic event exposures that are sudden, overwhelming and exceed beyond an individual's normal coping skills – may ultimately lead to adverse mental health consequences.
- For public safety personnel such as firefighters, such incidents pertain to injury or personal loss, exposure to burned bodies, life-threatening situations, failed rescue efforts or death of co-workers
- There is substantial evidence indicating that individual perceptions, rather than objective descriptions, are what determine whether or not a potentially traumatic event will be critical.
- Paucity of reports in the literature concerning the prevalence of critical incidents among female firefighters.
- Critical incident exposures have been associated with symptoms of post-traumatic stress disorder when controlling for age, gender and years of service

Objectives

- To estimate the prevalence of critical incidents in firefighters from across Canada,
- To determine whether the number of critical events varied based on age, gender, years of service,
- To integrate our prevalence estimates using meta-analysis with previous studies addressing the prevalence of critical incidents in firefighters.

Methods

- A cross-sectional survey of firefighters from 160 different locations across Canada, including Prince Edward Island.
- Firefighters were asked to complete a 24-item self-report Critical Incident Inventory survey.
- The survey included questions on a series of exposures to critical events while performing firefighting duties throughout the entire careers
- Critical Incident Inventory (CII) survey (firefighter specific) consists of six subscales: trauma to self, victims known to fire-emergency worker, multiple casualties, incidents involving children, unusual or problematic tactical operations, and exposure to severe medical trauma.
- Firefighters were asked to report whether an event had occurred throughout their careers.

Results

- 390 firefighters (272 males and 118 females) from 160 locations across Canada completed the survey.
- 74 firefighters from Prince Edward Island (68 males and 6 females) completed the survey
- Response rate was 100%

Table – 1 Demographic Characteristics

	Canada		Prince Edward Island	
	Males	Females	Males	Females
Sample size (n)	272	118	68	6
Age (years)	41.0 ± 9.5	34.3 ± 8.50	41.7 ± 11.7	33.5 ± 7.1
Height (m)	1.80 ± 0.30	1.67 ± 0.07	1.76 ± 0.20	1.73 ± 0.95
Weight (kg)	90.4 ± 14.0	70.2 ± 11.2	92.0 ± 16.50	82.0 ± 18.0
Service (years)	14.3 ± 9.0	6.80 ± 6.0	13.1 ± 10.2	6.00 ± 4.57
Prevalence of critical incidents (%)	97%	93%	95.5%	100%

Table – 2 Number and Percentages of Firefighters' Exposure to CII Sub-scale

	Canada		Prince Edward Island	
	Yes	No	Yes	No
Trauma to Self	347 (89%)	43 (11%)	60 (81%)	14 (19%)
Victims Known to Fire-Emergency Worker	311 (80%)	79 (20%)	60 (81%)	14 (19%)
Multiple Casualties	361 (93%)	29 (7%)	67 (91%)	7 (9%)
Incidents Involving Children	304 (78%)	86 (22%)	50 (68%)	24 (32%)
Unusual or Problematic Tactical Operations	343 (88%)	47 (12%)	57 (77%)	17 (23%)
Exposure to Severe Medical Trauma	340 (87%)	50 (13%)	60 (81%)	14 (19%)

Results (continued)

Table – 3 Regression model for factors predicting critical incidents in firefighters in Canada (n = 386).

Label	Coefficient	SE	P-value	Model R ²	Model SE
Model – 1					
Intercept	28.40	4.12	< 0.001	0.374	12.51
Age	-0.21	0.12	0.073		
Years of service	1.20	0.13	< 0.001		
Gender	-3.56	1.50	0.018		

- Gender and years of service were significant predictors,
- Model displayed a predictive value of **37.4%** for the number of critical incident exposures in firefighters (using variables: gender, years of service and age),
- With **1-year increase in years of services**, the number of critical incident exposures **increases by 1.2**.

Table – 4 Meta-analysis of the Number of Critical Incidents Among Firefighters in Northern America.

Study	Duration	Critical incidents	Firefighters	Proportion %	95% C.I.
Current Study	Career	376	390	96.40	94.10 – 98.00
MacDermid 2018	2-months	250	293	85.30	80.75 – 89.20
Carleton 2018	Career	568	569	99.80	99.00 – 99.99
Beaton 1999	1 year	531	625	85.00	82.00 – 87.70
Total	Random-effects model Heterogeneity I ² = 98.30% P < .001		1877	93.40	82.26 – 99.30

Subgroup analysis of the Number of Critical Incidents Stratified by Duration (up to 1 year)

Study	Duration	Critical incidents	Firefighters	Proportion %	95% C.I.
MacDermid 2018	2-months	250	293	85.30	80.75 – 89.20
Beaton 1999	1 year	531	625	85.00	82.00 – 87.70
Total	Random-effects model Heterogeneity I ² = 0.00% P = 0.91		918	85.00	82.62 – 87.3

Future Directions

- Quantify the impact of the events simultaneous to exposure assessments,
- Assess the impacts of health and work outcome in prospective longitudinal studies.

Conclusion

- Nearly all (96.4%) firefighters were exposed to some form of critical event over the span of their entire firefighting careers.
- Nine out of ten firefighters reported a respond to incident involving one or two deaths (multiple casualties)
- Age, gender, and years of service accounted for one-third of the variance in the number of critical incident exposures among firefighters.